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TASTE PANELS IN FOOD SCIENCE

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INTERNATIONAL FOOD INFORMATION SERVICE

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TASTE PANELS IN FOOD SCIENCE

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See also back page



1  
 Identifying and controlling product quality attributes - using preference taste panels. Esman, C. K. *Food Product Development* 5 (2) 15, 18 & 21-22 (1971) [3 ref. En] [John Sexton & Co., Chicago, Illinois, USA]  
 The usefulness of sensory evaluation of processed foods by taste panels together with measurements of certain physical properties is discussed in relation to quality control and to measuring the performance against competing products. AH

35  
 The concept of quality: relationship between sensory and instrumental analytical quality criteria.] Zum Begriff Qualität: Beziehungen zwischen sensorischen und instrumentalanalytischen Qualitätskriterien. Hegdy-Koats, L. *Nahrungsforschung* 15 (4) 257-270 (1970) [De] *Inst. für Lebensmittelchemie, Tech. Univ., Budapest, Hungary*

45  
 Determination of some carbamates by enzyme inhibition techniques using thin-layer chromatography and colorimetry. Mendoza, C. E.; Shields, J. B. *Abstracts of Papers. American Chemical Society* : PEST 68 (1971) [En] [Pesticide Section, Res. Div., Food and Drug Directorate, Ottawa, K1A 0L2, Canada]  
 The detection limits of 9 carbamate pesticides were determined by a TLC-enzyme inhibition technique. Indophenyl and 5-bromoindoxyl acetates were used as substrates of esterases from porcine livers. Effects of UV irradiation and Br on the pesticides were also studied. Furthermore, inhibition of esterases by these carbamates was determined by spectrophotometry using indophenyl acetate substrate. Inhibition was measured in relation to activity of untreated (control) enzyme. 2 ways of measuring % inhibition were used. Use of indophenyl acetate in both chromatographic and spectrophotometric methods could substantiate pesticide residue analysis by an enzyme inhibition technique. AS

103  
 Technological problems and trends in the fruit juice industry. II. Organoleptic evaluation of fruit juices.] Beiträge zu technologischen Problemen und Tendenzen in der Obstsaftindustrie. II. Sensorische Analytik bei Obstsaften. Hubert, K.-P.; Ach, G. *Lebensmittel-Industrie* 18 (4) 138-141 (1971) [35 De, en, ru]  
 Improvement of organoleptic testing techniques as a means of objective determination of fruit juice quality is discussed, subjective and objective methods being compared.

Essential prerequisites are knowledge of the physiology and anatomy of the senses, organoleptic training of testers, and understanding of the requirements of the tester and the testing room. [See FSTA (1971) 3 12H1773 for part I.] IN

1 M 68  
 Fractional pairs for the evaluation of palatability of chapaties made from bread wheats. Sadasivan, G.; Rai, S. C.; Austin, A. *Journal of Food Science and Technology (Mysore)* 8 (1) 7-10 (1971) [9 ref. En] [Indian Agric. Res. Inst., New Delhi, India]

A taste testing experiment was conducted on chapaties prepared from 4 improved varieties of wheat (Sharbati Sonora, Sonalika, K65 and C306). A panel of 3 judges was selected from a total of 6 following selective taste trials. Sharbati Sonora was evaluated against the other 3 varieties and the ranking test, test of proportions and Chassan's method for order [Biometrics (1960) 16: 119] applied for evaluation of results. It was found that the last mentioned test gave the most satisfactory evaluation for a small testing panel. No significant difference could be found between the different varieties of wheat. BM

1 S 80  
 Meat quality: influence of fatness of pigs on the eating quality of pork. Rhodes, D. N. *Journal of the Science of Food and Agriculture* 21 (11) 572-575 (1970) [10 ref. En] [Agric. Res. Council, Meat Res. Inst., Langford, Bristol, BS18 7DY, UK]

The eating qualities of pork from the longissimus dorsi muscles of pigs showing a wide variation in fatness (10-40mm, back fat thickness) were assessed by taste panel after either the excised muscle had been grilled or a complete loin joint had been grilled or a complete loin joint had been roasted. The average panel scores for texture and juiciness covered a wide range but were not consistently related to fatness. Although meat from fatter pigs tended to be judged more tender in direct comparisons, overall the results did not support the contention that fatness in the carcass is associated with tenderness in the lean meat. AS

1 T 37  
 Techniques in the sensory analysis of flavours. [A lecture] Spencer, H. W. *Flavour Industry* 2 (5) 293-302 (1971) [19 ref. En] [Lyons Central Lab., 149 Hammersmith Rd., London W14, UK]

The subject is reviewed under the headings: sensory techniques (operation of sensory analysis abroad, inter-actions of the basic tastes, types of sensory tests i.e. difference tests, descriptive or analytical tests); recommended conditions of testing (environment, presentation of samples, judges, time of testing, sample factors); the formation of a flavour panel (selection and training of panelists); results obtained by the trained flavour panel and



correlation between sensory tests (duo-trio test, matching test, flavour profile technique); and examples of instrumental and sensory correlation. VJG

1 T 54

[Food flavours.] [A review]

Yamanishi, T.

Seasoning Science [Chomi Kagaku] 17 (4) 123-132 (1970) [2 ref. Ja] [Ochanomizu Univ., Bunkyo-ku, Tokyo, Japan]

Topics considered include threshold values of taste and flavour substances, and the flavour of soy sauce, dried bonito, sesame oil, mandarin orange and other citrus fruits, and green and black tea. Gas chromatograms obtained by the author are presented. SKa

2 A 81

Food analysis: theory and practice. [A book]

Pomeranz, Y.; Meloan, C. E.

viii+669pp. ISBN 0 87055 100 0 (1971) [Numerous ref. En]

Mass

spectroscopy (pp. 213-228, 4 ref.); Nuclear magnetic resonance (pp. 229-237, 14 ref.); Radioactivity and counting techniques (pp. 238-252, 9 ref.); Column chromatography (pp. 253-280, 12 ref.); Paper and thin-layer chromatography (pp. 281-294, 5 ref.); Gas-liquid chromatography (pp. 295-313, 4 ref.); Extraction (pp. 314-323, 11 ref.); Centrifugation (pp. 324-332, 14 ref.); Densimetry (pp. 333-342, 5 ref.); Refractometry (pp. 343-351); Polarimetry (pp. 352-361, 4 ref.); Rheology, (pp. 362-407, numerous ref.); Serology, immunochemistry and immunoelectrophoresis (pp. 408-420, 45 ref.); Enzymatic methods (pp. 421-447, numerous ref.); Analytical microbiology (pp. 448-474, 92 ref.); General remarks (pp. 475-480); Determination of moisture (pp. 481-510, 70 ref.); Ash and mineral components (pp. 511-533, 81 ref.); Carbohydrates (pp. 534-577, numerous ref.); Lipids (pp. 578-627, numerous ref.); Nitrogenous compounds (pp. 628-651, numerous ref.); and Objective vs. sensory evaluation of foods (pp. 652-658, 11 ref.). A subject index is included. JA

2 A 84

Organoleptic assessment as a quality control medium.

Parsons, W. A.

Food Industries of South Africa 24 (4) 5, 11 & 13-14 (1971) [3 ref. En]

The flavour concept is first outlined. Emphasis is given to taste panel selection and training and to the relative importance of different attributes for the specific subject under test. Types of organoleptic panel namely descriptive, preference and difference panels are briefly considered. Other topics considered are: flavour-evaluation methods (analytical and consumer systems) as set out by G. Jellinek, the flavour profile method of Cairncross and Sjöström, coding of samples, environment of the panelist, sample presentation, smelling procedure, odour confinement and tasting procedure. VJG

2 A 106

Sensory methodology for product development.

Ellis, B. H. (Editor)

Food Product Development 4 (5) 86-87 & 90-91 (1971) [En]

Basic objects of sensory testing are to determine whether the food product is acceptable to a consumer, whether this acceptability can be maintained in production and how long it can be maintained on the shelf. The best indication of consumer acceptance is measurement of sales returns but this is expensive, time consuming and often impracticable. The most practical method is to use sensory testing panels.

Instrument tests alone are not satisfactory since the results are difficult to correlate with overall human judgements. Three types of sensory methods are discussed and classed as effective, discriminative and descriptive. The effective tests include preference and acceptance tests, using ranking, comparison of paired products and hedonic rating scales. Discriminative tests include standard difference tests and sensitivity tests (threshold, dilution) to determine the difference or similarity between products. Descriptive tests are used to determine the characteristics of the product and usually combine qualitative and quantitative aspects. They are mainly used as tools in product development. Various practical examples are given. JEP

2 A 107

Consumer awareness of and attitudes to food texture. I. Adults.

Szczesniak, A. S.; Kahn, E. L.

Journal of Texture Studies 2 (3) 280-295 (1971) [3 ref. En] [General Foods Corp., Tech. Centre, White Plains, New York, USA]

Although its awareness appears to be present on a subconscious level, texture plays a very essential role in determining people's feelings about foods. Intensity of flavour, socially and culturally learned expectations, psychological and physiological factors, sex, socio-economic class, image of a food, and eating occasions influence awareness of and attitudes to texture among adult consumers. Texture awareness is increased when expectations are violated, associations are made with non-food item, or unpleasant mouth sensations are experienced. Textural qualities are often linked with wholesomeness and excellence of food preparation. [See also FSTA (1971) 3 10A445.] AS

2 A 123

[Training in sensory evaluation.] Aus- und Weiterbildung in sensorischer Analytik.

Neumann, R.; Lessing, K.; Molnar, P.; Kochan, A.

Lebensmittel-Industrie 18 (1) 5-7; (2) 45-47; (3) 91-94 (1971) [41 ref. De] [Fachabteilung Nahrungsgüter des DAMW, Berlin, Germany]

Detailed descriptions are given of methods employed for sensory evaluation of foods, with the aim of improving the training and competence of tasting panel members. HBr



annual report, 1969, of the Research Institute Brewing in Berlin.] Jahrbuch 1969 der Versuchswissenschaftlichen Lehranstalt für Brauerei in Berlin. Krauss, G. (Editor) Jahrbuch der Versuchs- und Lehranstalt für Brauerei in Berlin 293pp. (1969) [De] This report, which gives an account of the work during 1969 of Res. Inst. for Brewing (Versuchswissenschaftliche Lehranstalt für Brauerei), Berlin, and its subsidiary institutes, includes the following summaries: Kolbach number, malt quality and beer quality, by H. Schilfarth & G. Sommer (pp. 124-129); Effect of hop seeds on beer quality, by G. Krauss, H. Schilfarth & G. Sommer (pp. 127-129); Brewing experiments with hop extracts of varying protein content, by G. Krauss, C. Zürcher & A. von (pp. 129-132, 10 ref.); Isomerized hop extracts, by G. Sommer (pp. 137-138); Application of viscosity of wort and beer extract to determination of known extract content for calculating that of any given extract content, by C. Zürcher (pp. 138-140, 2 ref.); The multiple sample technique for tasting more than 2 beers, by C. Zürcher (pp. 140-144); The 'micro'-brewery of the Res. Inst. for Brewing, by G. Krauss & C. Zürcher (pp. 144-146); Gas chromatographic analysis of the behaviour of hop oil components during brewing, by K. Silbereisen & G. Baron (p. 207); Preservatives in beer, by K. Silbereisen & B. Wagner (pp. 207-208); High molecular N compounds observed in some methods for determining protein solubility of beer, by K. Silbereisen & D. Breyer (p. 209); Determination of dissolved O<sub>2</sub> in beer, by H.-H. Schmidt (pp. 209-210); Relationship between sensory findings and analytical values of beers, by E. Krüger (p. 211); Production of some organic acids in brewing, by B. Drews (pp. 234-235); and Volatile S compounds in beer and their determination by gas chromatography, by B. Drews, G. Bärwald & H.-J. Niefind (pp. 232-234). JB-IGB

H 334 Sensory examination of orange juice by the DLG and polarity methods.] Sensorische Prüfung von Orangensaft nach DLG-Bewertung und Polaritätsmethode.

Hegele, H. Zeitschrift für Obstbau und Weinbau 38 (2) 46-50; (4) 142-151 (1971) [ref. De] [Donath-Kelterei, Unterföhring, W. Germany] The DLG (Deutsche Landwirtschaftsgesellschaft) method, based on numerical scoring of colour, acidity, odour and taste, and the polarity method, based on evaluation of opposite pairs [see Hegele (1960) Ernährungswirtschaft 7 (6) 243 & 244; Randebrock (1965) I. Soc. cosmetic chemists 16: 653-677] were compared, using 5 different orange juice samples. The polarity method was found to give considerably more information not only with regard to the sample, but also to the tester and test method. HBr

53 Stability of chemical analytical methods for quality evaluation of frozen fish.] Die Möglichkeit chemisch-analytischer Methoden zur Qualitätseinschätzung von Gefrierfisch. Knicker, W.

Ernährungsforschung 15 (4) 393-402 (1970) [12 ref. De] [Inst. für Hochseefischerei und Fischverarbeitung, Rostock, E. Germany]

Chemical, physical and microbiological methods are available for establishing the changes occurring in frozen fish; frequently they are used in combination. However, the best approach is to divide the classes of compounds which undergo change during storage into groups; methods are available for determining lipid changes, degradation of N compounds and protein changes and for sensory evaluation of quality. Studies were carried out on frozen herrings and residue from liver oil production, using a storage temp. of -15°C. With lean fish samples, a general increase in contents of N compounds with increasing storage time could be observed, but no satisfactory results could be obtained for determination of volatile basic N compounds in fatty fish, since changes in compounds were hidden by the degradation reactions. With the protein changes, general turbidity measurement did not give reproducible results, a microscopic examination of the homogenates being more promising. Tissue moisture loss increased with prolonged storage. Determination of extractable protein N was not related to storage time. IN

2 R 92

Quality control and fish handling in New Zealand. Sorensen, T.

Food Technology in New Zealand 6 (7) 31-33 & 35 (1971) [En]

Studies on the spoilage of fish, quality assessment, and organoleptic assessment were carried out. Greatest problems were encountered in the hottest months, Dec. and Jan. Score sheets were drawn up for the quality of fish landed, and the establishment of limits of acceptance was discussed. In an attempt to raise standards the introduction of quality incentives was considered. BFMIRA

2 S 156

The effect of different types of pasture on the organoleptic qualities of lambs.

Nicol, A. M.; Jagusch, K. T.

Journal of the Science of Food and Agriculture 22 (9) 464-466 (1971) [13 ref. En] [Lincoln Coll., Univ., Canterbury, New Zealand]

The palatability characteristics of carcasses of lambs grazed on either pure perennial ryegrass or pure lucerne were studied in 3 experiments. Consumer preferences were ascertained in 2 experiments with untrained members of the public who scored the meat for flavour, tenderness and juiciness. The type of pasture had no significant effect on the palatability characteristics examined but the shoulder joints were significantly more juicy than the legs. In a third experiment, members of a trained taste panel were able to detect a significantly more intense flavour and odour from the casserole of twelfth rib chop of lucerne-grazed lambs than that from lambs grazed on perennial ryegrass. Since the results from the consumer acceptance tests and the trained



taste panel were inconsistent, it is concluded that both methods of assessing palatability should be carried out concurrently in any evaluation of meat quality. AS

## 2 U 96

### Preparation of infusion of black tea for use in organoleptic tests.

Ceylon, Bureau of Ceylon Standards

Ceylon Standard CS 78: 1969 9pp. (1969) [En] [53, Dharmapala Mawatha, Colombo 3, Ceylon]

The objective is to reduce the variable factors associated with tea tasting which arise from variations in the size of pots and bowls, in the quantity of tea infused and the preparation of the infusion. The present standard is based on ISO/TC 34/SC 8/WG 1-Tea. Specifications are given for two standard sizes of white glazed earthenware or porcelain pots and bowls which are illustrated with detailed dimensions and tolerances.

Capacities are: nominal (to  $5 \pm 1$  mm from brim) and to the brim respectively 284 ml and  $310 \pm 8$  ml (large pot), 142 ml and  $150 \pm 4$  ml (small pot).

Max. bowl capacities are 380 ml (large) and 200 ml (small). Place either  $5.6 \pm 0.1$  g or  $2.8 \pm 0.05$  g tea in a large or in a small pot respectively, pour on freshly boiling demineralized water (not ordinary drinking water) to within 4-6 mm of the rim and replace lid. Brew for exactly 6 min and pour liquid without the leaf into the bowl for inspection and tasting. For preparation with milk, add 5 ml milk to the large bowl or 2.5 ml to the small bowl. ELC

## 3 A 127

### [Organoleptic study of odour and taste of foods.]

Köster, E. P.

Voedingsmiddelentechnologie 2 (47) 8-11 (1971) [6 ref. Nl] [Psychologisch Lab. Rijksuniversiteit, Utrecht, The Netherlands]

## 3 A 134

### [Statistical control of quality in the food industry. Evaluation of organoleptic characteristics.]

Carisano, A.

Industria Agraria 9 (5) 199-203 (1971) [12 ref. It, en] [Lab. Ricerche e Controlli della STAR de Agrate Brianza, Milan, Italy]

## 3 A 147

### Physicochemical stereospecificity in taste perception of $\alpha$ -D-mannose and $\beta$ -D-mannose.

Stewart, R. A.; Carrico, C. K.; Webster, R. L.; Steinhart, R. G., Jr.

Nature (London) 234 (5326) 220 (1971) [3 ref. En] [Dept. of Chem. & Psychology, Hollins Coll., Virginia 24020, USA]

A taste panel of 5 male and 5 female subjects, aged 19-24 yr, were each given 13 test trials which included 4  $\alpha$ -D-mannose samples, 4  $\beta$ -D-mannose samples, 4 equilibrium mixture samples and 1 dextrose sample as a control. Subjects' responses to the substances tested are tabulated; they very reliably reported a sweet sensation in the presence of  $\alpha$ -D-mannose and a bitter sensation in the presence of  $\beta$ -D-mannose. Thus it

seems that the so-called 'ambiguity' of taste associated with D-mannose is due solely to the slight difference in molecular structure between D-mannose and  $\beta$ -D-mannose. These results confirm the conjecture that a high degree of physicochemical stereospecificity is exhibited by taste receptors. AB

## 3 A 164

### Standardization of terminology in the field of organoleptic properties.

Schwob, R.

Flavour Industry 2 (11) 627-629 (1971) [En]

## 3 A 166

### Laboratory handbook of methods of food analysis. [A book]

Lees, R.

2nd edition xii + 192pp. ISBN 0 249 44090 7 (1971) [Numerous ref. En] London, UK: Leonard Hill Price £3.80

This 2nd edition has been revised and its value enhanced by the inclusion of a subject index, but it remains a practical work book designed with the needs of the laboratory worker in mind. All techniques included have been chosen for their suitability for use in the factory laboratory. All methods given in the 1st edition have been reviewed and revised where appropriate; a number of additional methods have been included. The book is divided into 3 sections: Notes on general laboratory methods used in food analysis (pp. 1-39), which covers sampling, laboratory techniques, chromatography, optical analytical techniques, taste panel testing, and useful information for the food analyst (e.g. atomic weights); Index to methods of analysis for named foodstuffs (pp. 41-76) (foodstuffs are listed alphabetically); and Methods of analysis (pp. 77-186). [See FSTA (1969) 1 5A115 for 1st edition.]

## 3 G 138

### [Annual report 1.7.1970-30.6.1971.]

Sweden, Svenska Institute for Konserveringsforskning

SIK Rapport 294: 93pp. (1970/1971) [Sv, en]

This account of work carried out at the Swedish Institute for Food Preservation Research, Göteborg, in 1970-1971 includes brief reports on the following topics (pp. in parentheses): Biosynthesis of flavour compounds in vegetables (8 & En version 71-72); Effect of climatic conditions on aroma of berries and other fruit (8 & 72); Aroma of processed berries (9 & 73); Aroma changes in deep-frozen cod (10 & 73); Aroma formation on heat treatment of protein (11-12 & 74-75); Electrophysiological measurement of odour intensity of aroma compounds (12 & 75); Correlation between physico-chemical and sensory data on odour compounds, on the basis of computer techniques (13 & 75-76); Proteorheology (14-15 & 76-77); Methods for selection and control of taste panel judges (19-20 & 79-80); Methods for determining oxidative rancidity (21 & 81); Fat oxidation in dried foods (22 & 81-82); Keeping qualities of fat in dried and baked products (22-23 & 82); Heat inactivation of vegetable enzymes (23-24 & 82-83); Role of hami-



proteins in food stability (24-25 & 83-84); Fat-splitting microorganisms (27 & 85-86); New methods for rapid freezing of foods (28-29 & 86-87); Structural changes in animal products caused by freezing procedures (29-30 & 87); Protein changes in frozen cod muscle tissue (30-31 & 86-87); Structural changes in vegetable products (33-34 & 89-90); Freezing and heating experiments with meat and gravy (34-35 & 90); and Cooking and reheating of foods in combination with preservative treatment (35-36 & 91). HBr

3 H 439

[Wine analysis.] Weinanalytik. [A book] Franck, R.; Junge, C. 420pp. ISBN 3 452 17096 9 (1970) [De] Cologne, W. Germany: Carl Heymanns Verlag KG Price DM 98

This loose-leaf publication, in a sturdy plastic-covered binding, gives general regulations governing the analysis of wine and similar alcoholic beverages, as well as of fruit juices. It is divided into the following sections: sphere of validity; sampling and handling of samples; scope of tests; organoleptic testing; chemical and physical methods of analysing wines, sparkling wines, brandies, distillates, fortified wines and related products; analysis of wines for export; conclusion (including various tables of correction factors etc. and diagrams of analytical apparatus used); and the analytical procedure laid down by the Office International de la Vigne et du Vin (OIV). HBr

3 J 449

[Organoleptic assessment of potato flakes.] Rubkiewicz, K. *Przemysł Spożywczy* 25 (10) 407-409 (1971) [15 ref. Pl, ru, en, fr, de] [Centralne Lab. Przemysłu Ziemniaczanego, Poznań, Poland]

A 5-point scale for assessment of each of 4 attributes (aroma, taste, colour and consistency) of potato flakes after reconstitution with milk and hot water is described as well as its application to 6 samples by a 6-member panel. Weighting factors for the attributes calculated from multiple and partial regression coeff. are listed. SKK

3 J 511

Sensory evaluation of breaded, deep-fried turnip slices.

Reddy, P. J.; Collins, J. L.; McCarty, I. E Johnston, M. R. *Food Product Development* 4 (8) 38 & 40 (1971) [9 ref. En] [Dept. of Food Tech., Univ., Knoxville, Tennessee, USA]

The development of methods of preparation which could make turnips more acceptable to modern taste is considered. In this trial, young turnip roots were peeled and cut into three sixteenth in slices, which were halved and blanched for 2 min in boiling water. 4 batter mixes were tried: (i) a commercial mix; (ii) the same as (i) + 10% soy protein; (iii) same as (i) + 0.5% carboxymethylcellulose (CMC); (iv) the same as (i) + 10% soy protein + 0.5% CMC; (v) was raw turnip. Turnips were dipped in one of the mixes.

drained, coated with biscuit crumbs and deep-fried in vegetable oil at 350°F for 3 min. (iv) was the mix which received highest marks for palatability, and (iii) was preferred to (ii). IFLaC

3 M 276

Physicochemical quality of rice.

Tani, T.; Chikubu, S.; Horiuchi, H. *Journal of the Japanese Society of Starch Science* [Denpun Kogyo Gakkaishi] 17 (1) 139-153 (1969) [18 ref. En] [Food Res. Inst., Koto-Ku, Tokyo, Japan]

Some physicochemical properties of 2 types of rice, *Dryza sativa* var. indica and var. japonica, were compared. The japonica rice was a 'sticky' type with a round grain shape and with low values for amylose content, starch pasting temp., viscosity of starch paste, water uptake and increase in vol. on cooking. Indica rice was a 'flaky' type with long grains. Comparisons of starch properties, cooking qualities of milled rice and inorganic constituents of brown rice grown in different regions of Japan showed that geographical location had a greater effect on these properties than variety of rice or method of cultivation. Correlations between various properties of the starch and the cooking quality and palatability were also studied and are discussed. MEG

3 R 104

Fish inspection and quality control. [A book]

Kreuzer, R. (Editor)

hvi + 290pp. (1971) [Numerous ref. En, fr, es]

Quality control

and inspection of European comminuted products, by L. Herborg (pp. 124-128, 7 ref.); A study of the quality assessment of fish protein concentrate, by E. K. Moustafa (pp. 130-131); Zone electrophoresis and its application to fishery product inspection, by R. J. Learson (pp. 132-133, 1 ref.); Product protection and quality control through combined industry effort, by I. I. Somers, C. W. Bohrer; J. M. Reed & R. P. Farrow (pp. 136-138); Improvement of the quality of fish products in retail stores, by P. G. Houle, J. M. Graham & R. A. Poirier (pp. 139-141); Importance of quality control in the fish industry, by R. M. Boshell (p. 142); An industry view on fish inspection, by H. D. Pyke (pp. 143-144); Some economic aspects of quality control, by E. B. Slack (pp. 144-148, 28 ref.); Fish quality in Ireland as part of an overall marketing programme, by P. J. Rock (pp. 148-150); Quality standards and the marketing mix, by J. C. O'Sullivan (pp. 151-154, 1 ref.); Consumer evaluation of fresh and frozen fish, by J. J. Connell & P. F. Howgate (pp. 155-159, 3 ref.); A systems approach to quality control and inspection in (pp. 160-167); Food quality evaluation: a review of sensory methods, by E. Larmond (pp. 172-175, 29 ref.); Appraising smoked whitefish with sensory panels, by M. Vaisey, M. Slusar, D. Babienko & A. W. Lantz (pp. 175-180, 19 ref.). [Continued in following abstr.] AL



3 R 105

**Fish inspection and quality control.** [A book]  
Kreuzer, R. (Editor)

xvi+290pp. (1971) [Numerous ref. En, fr, es]

[Continued from preceding abstr.] Comparison of sensory and objective methods for quality evaluation of fresh and frozen saltwater fish, by N. Antonacopoulos (pp. 180-182); The estimation of trimethylamine in fish muscle, by J. M. Shewan, D. M. Gibson & C. K. Murray (pp. 183-186, 23 ref.); Proposed modification of Dyer's method for trimethylamine determination in cod fish, by H. Tozawa, K. Enokihara & K. Amano (pp. 187-190, 11 ref.); Variation of biochemical quality indices by biological and technological factors, by D. F. Hiltz, W. J. Dyer, S. Nowlan & J. R. Dingle (pp. 191-195, 33 ref.); Hypoxanthine as an indicator of freshness in iced Cape hake before freezing and after thawing, by J. R. Burt & C. K. Simmonds (pp. 196-202, 27 ref.); A critical appraisal of tests for evaluating quality loss in frozen stored fish, by J. J. Connell & P. F. Howgate (pp. 202-206, 7 ref.); The TTC test for evaluating the freshness of shucked oysters, by T. Mochinaga (pp. 206-207, 1 ref.); Some recent results on the use of the Inteletron Fish Tester MK 5, by D. M. Gibson & J. M. Shewan (pp. 208-210, 7 ref.); Characteristics of white muscle fluorescence in pre-rigor fish, by S. V. Manohar (pp. 211-215, 14 ref.); Hygienic and safety aspects of quality control, by F. Thatcher (pp. 222-225, 2 ref.); Quality aspects of industrial water thawing and fillet processing, by W. A. MacCallum (pp. 225-233, 4 ref.). [Continued in following abstr.] AL

3 R 106

**Fish inspection and quality control.** [A book]  
Kreuzer, R. (Editor)

xvi+290pp. (1971) [Numerous ref. En, fr, es]

Influence of bacteriological standards on the quality of inspected fisheries products, by N. Neufeld (pp. 234-240, 20 ref.); Fish plant water supplies, by W. J. Brownlee (pp. 241-243); Food poisoning in Japan caused by poisonous fish, by T. Kawabata (pp. 243-245, 9 ref.); Survival and growth of pathogenic bacteria in seafoods by J. Liston, J. R. Matches & J. Baross (pp. 246-249, 13 ref.); Seafoods and botulism, by J. T. Graikoski (pp. 249-255, 28 ref.); Ultrasonic inspection of parasitized whole fish, by M. Freese (pp. 256-262, 9 ref.); Infestation of fish in Brazil with *Tetrarhynchus fragilis* larvae, by C. A. M. Lima dos Santos & E. P. V. Zogbi (pp. 262-264, 8 ref.); Food safety programmes of the World Health Organization, by F. C. Lu (pp. 264-265, 6 ref.); The training of fishery inspectors, by J. Walls (pp. 270-274, 11 ref.); Training and evaluation of trainees for the organoleptic assessment of fishery products for quality control laboratories, by S. Varga (pp. 275-276, 6 ref.); Fish quality and the Fishery School at Grande-Riviere, Quebec, by L. J. Berube (pp. 277-279, Fr, en, es); International standards for fish and fishery products (Codex Alimentarius), by O. R. Braekkan (pp. 284-287); and Codes of practice for fish and fishery products, by R. Kreuzer (pp. 287-290). AL

3 S 282

**[The development of a system for the organoleptic evaluation of meat quality for commercial and research purposes.]**

Solntseva, G. L.; Dinarieva, G. P.

Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Myasnoi Promyshlennosti 23: 121-128 (1970) [Ru, en, de]

Methods for organoleptic evaluation and scoring of meat are discussed, and a 9-point classification was formulated. The parameters assessed were: appearance; colour of cuts; aroma; taste; consistency; succulence; salting and overall quality. There are precisely defined terms for 9 points for each of the above parameters. STI

3 S 287

**[Sensory investigation of meat broth aroma and taste development by the "dilution index" method.]**

Solntseva, G. L.; Dinarieva, G. P.

Trudy, Vsesoyuznyi Nauchno-Issledovatel'skii Institut Myasnoi Promyshlennosti 23: 129-132 (1970) [Ru, en, de]

The principle of the method consists in preparing 2 sets of samples for tasting: in the first set, 120 g meat broth was diluted with water in the ratio 1:5 and 20-ml samples were kept at boiling temp. for 10-120 min. Aroma and taste of individual samples, uniformly prepared, were classified by 6 trained taste-testers. In the second set, meat broth solution samples, diluted with water in the ratio 1:5 were cooked for 15, 30, 45 and 60 min and diluted again in water to the ratios 1:60, 1:80, 1:100, 1:120, 1:140, 1:180, 1:200, 1:250 and 1:300. A further tasting followed. The most specific aroma and taste were recognized after 45 min cooking at 95°C, with a dilution ratio of 1:160. With prolonged heat treatment, no aroma or flavour intensity gradation in the meat was registered. STI

3 T 140

**Flavour research. Principles and techniques.** [A book]

Teranishi, R.; Hornstein, I.; Issenberg, P.; Wick, E. L.

ix+315pp. ISBN 0 8247 1663 9 (1971) [Numerous ref. En] New York, USA: Marcel Dekker, Inc. Price £9.3

This well-presented book contains the following chapters: Chemical aspects of flavour (pp. 1-35, 89 ref.); Isolation of flavour concentrates (pp. 37-76, 69 ref.); Gas chromatography separations (pp. 77-106, 36 ref.); Special application of gas chromatography (pp. 107-132, 33 ref.); Mass spectrometry: instrument requirements and limitations (pp. 133-179, 40 ref.); Combined gas chromatography-mass spectrometry: special techniques, data processing (pp. 181-232, 60 ref.); Other identification methods: trapping, NMR, IR, Raman (pp. 233-257, 45 ref.); Correlation with sensory properties (pp. 259-294, 75 ref.). AL

4 A 169

**A retrospective view of sensory analysis and some considerations for the future.** [A review]  
Tilgner, D. J.Advances in Food Research 19: 215-277 (1971)  
[Numerous ref. En] [Abrahama 1m., 3a, Sopot, Poland]



The subject is reviewed under the headings: Landmarks of basic odour studies; Landmarks of applied sensory science; Specialized research - texture studies, the flavorology era; Educational and extension work; Knowledge of stimulation phenomena - increasing sensory potentials; Objectivized quality evaluation studies - appearance factors, preparation factors, national committees; The basic dilemma; Research needs. JN

4 A 190

**Analytical evaluation of food quality.**

Reymond, D.

*Food Technology* 25 (11) 1152-1154 & 1156 (1971) [11 ref. En] [Res. Lab., Nestle Products Technical Assistance Co. Ltd., Vevey, Switzerland]

The application of analytical techniques such as UV absorption spectroscopy and gas chromatography to the assessment of taste and smell and hence the objective determination of flavour in the evaluation of food products' quality, is discussed. The use of these techniques in assessing the influence of processing on the flavour of food products and for standardization of processing conditions is described with reference to the processing of milk, coffee, tea, cocoa butter, tomato puree and frozen peas. AB

4 A 207

**Sensory assessment of food texture.** [A lecture]

Abbott, J. A.

*Food Technology* 26 (1) 40, 42 & 45-49 (1972) [25 ref. En] [Horticultural Crops Res. Branch, Market Quality Res. Div., USDA, Beltsville, Maryland 20705, USA]

Sensory panels are necessary for assessing the importance of texture and for determining the validity of instrumental measurements of texture-related properties. Each of the sensory panel methods serves a specific purpose so that the correct method must be selected. References on general sensory testing methodology are given and preference/acceptance, discriminatory, and descriptive test methods are discussed as they relate to evaluation of food texture. Consumer surveys of popular texture terminology are reviewed. Uses of ranking, rating and profiling are discussed and examples given. IFT

4 A 209

**Texture - its definition, measurement & relation to other attributes of food quality.** [A lecture]

Kramer, A.

*Food Technology* 26 (1) 34-36 & 38-39 (1972) [17 ref. En] [Dept. of Food Sci., Univ., College Park, Maryland 20472, USA]

The problems involved in defining texture as a major component of sensory food quality are reviewed and discussed, and the present generally acceptable definition of texture is given. Methods are discussed by which textural quality may be

measured directly and therefore accurately but subjectively by sensory panels representing the target population; or indirectly but objectively by one or a combination of force measuring instruments whose precision and calibratability can be maximized. It is concluded that accuracy (predictability) of an objective method can be determined only by its correlation with sensory panel responses. IFT

4 A 210

**Effect of temperature on threshold values for citric acid, malic acid and quinine sulphate - energy of activation and extreme-value determination.**

Powers, J. J.; Howell, A. J.; Lillard, D. A.; Vacinek, S. J.

*Journal of the Science of Food and Agriculture* 22 (10) 543-547 (1971) [31 ref. En] [Dept. of Food Sci., Univ., Athens, Georgia 30601, USA]

Thresholds for perception of citric and malic acid in surrounding temp. of 2, 20.5 and 41°C and of quinine sulphate at 3, 22 and 38°C were determined at the 50% level, the 75% ASTM level and at the 5% probability level. Although there were threshold differences dependent on temp., these were often overridden by judge-specific factors. Thresholds for the acids tended to be higher at 2°C than at the other temp. and were significantly higher for quinine sulphate at 3°C than at 22°C. The acid results support the view that pH is not responsible for sourness. Energy of activation for taste response was usually 5-20 kcal, suggesting that a process such as adsorption may be involved. Extreme value tests with quinine sulphate using many additional judges indicated that such methods should be useful in predicting the % of individuals whose thresholds will be below a certain level. MJD

4 G 180

**A study of the palatability of food products made with synthetic and filled milks.**

Russell, W. E.; Sanderson, M.

*Canadian Institute of Food Technology Journal* 4 (4) 175-178 (1971) [6 ref. En, fr] [Dept. of Consumer Studies, Univ., Guelph, Ontario, Canada]

Food products made from synthetic and filled milks were evaluated for consumer acceptability in 2 test series. In one, 2 synthetic milks containing coconut oil and maize syrup solids, one having soya protein and the other sodium caseinate, were compared with liquid whole milk for general palatability and for components of palatability. Products rated were liquid milk as a beverage, chocolate drink, white sauce, maize starch pudding, baked custard, muffins and plain cake. Whole milk was superior to both synthetic milks except in chocolate drink, muffins and cake. In chocolate drink, sodium caseinate milk was judged equal to liquid whole milk, but soya protein milk was inferior. Milk containing sodium caseinate was the preferred synthetic milk. In series 2, the



preferred synthetic milk and a filled milk were compared with liquid whole milk when used in the same products. The filled milk was liquid skim-milk plus 3.5% coconut oil. Sodium caseinate milk was better than liquid whole milk for general palatability in plain cakes. Liquid whole milk was significantly better than sodium caseinate milk but not than filled milk for general palatability in muffins. In other products, liquid whole milk received the highest rating, filled milk came second and sodium caseinate milk was least acceptable. AS

4 T 206

**Flavour research; noses, mouths test for tastes.** Moulton, D. G.

**Candy and Snack Industry** 136 (9) 47, 50 & 52 (1971) [En]

Flavour potentiators monosodium glutamate and 5'-nucleotides, and the flavour modifiers, gymnemic acid and miracle fruit are briefly discussed. The contribution of odour to taste is then considered. In assessing the relative importance of taste and smell a new testing method has been devised. The subject has 2 hollow teflon nasal plugs inserted through which pure air, untainted with the test food odour, is passed. This type of work is being carried out at the Monell Chemical Senses Centre at the University of Pennsylvania. BFMIRA

4 T 254

**An evaluation of the odour qualities of some stimuli proposed as standards for odour research.** Land, D. G.; Harper, R.; Griffiths, N. M.

**Flavour Industry** 1 (12) 842-846 (1970) [17 ref. En] [Food Res. Inst., Colney Lane, Norwich, NOR 70F, UK]

14 of the 15 chemicals (iso-borneol, 2 sec butyl cyclohexanone, cedrol, coumarin, dimethyl benzyl, carbonyl acetate, Fixateur 404, p-hydroxy benzyl acetone, indole, linalöl, methyl nonyl acetaldehyde, musk 89, phenylethyl dimethyl carbinol,  $\alpha$ -terpineol and tonalid) which the Gordon Research Conference on Olfaction suggested could be used internationally for odour research, are considered. These 14 samples together with 12 substances used in a previous study were presented for odour characterization. 12 subjects were asked to mark a score sheet for 44 qualities using a scale 0 (absent) to 5 (present in extreme amount). Results are set out under each of the 14 stimuli in the form of a glossary with comments. The suitability of these odorants as reference standards and as representatives of the major odour classes is discussed. Results show that only iso borneol (camphoric), 2 sec butyl cyclohexanone (minty), coumarin (sweet) and phenylethyl dimethyl carbinol (floral) were strongly classified in terms of the quality they were meant to represent. VJG

5 A 226

**[Determination of taste difference thresholds by constant stimulus method.]**

Barylko-Pikielna, N.; Baldwin, Z.; Przedziecka, **Roczniki Instytutu Przemysłu Miesnego** 8 (2) 67-72 (1971) [4 ref. Pl, ru, en]

5 A 249

**[New methods for evaluating and interpreting organoleptic characteristics of foods and for the forecasting of changes in them. I. Problems of evaluation and interpretation of organoleptic characteristics.]** Neue Methoden der Be- und Auswertung sensorischer Eigenschaften von Lebensmitteln und der Berechnung ihrer Veränderungen. I. Zur Problematik der Be- und Auswertung sensorischer Eigenschaften. Herrmann, J.

**Nahrung** 15 (7) 781-786 (1971) [12 ref. De, en, ru] [Sektion NGW Lebensmitteltech., Biochem. Konservierung der Lebensmittel der Humboldt-Univ., Berlin, E. Germany]

5 G 274

**Sensory quality evaluation of papads: quality profile technique and development of a composite scoring scale.**

Govindarajan, V. S.; Dhanaraj, S.; Subramanyam, L.; Sastri, B. N.

**Indian Journal of Nutrition and Dietetics** 8 (5) 24-259 (1971) [8 ref. En] [Central Food Tech. Res. Inst., Mysore-2 A, India]

The training and testing of panels and the development of a composite scoring scale for evaluation of raw and fried 'papads' (an Indian snack food) are described. In the 2 page appendix descriptive quality characteristics, grades and score for raw and fried, boldly speckled, and individual o mixed spice papads, are tabulated. AB

6 A 297

**[New methods for the evaluation and interpretation of sensory qualities of foodstuffs and for forecasting changes. III. Problems of scales for grading.]** Neu Methoden der Be- und Auswertung sensorischer Eigenschaften von Lebensmitteln und der Berechnung ihrer Veränderungen. 3. Zur Problematik der Bewertungsskalen. Herrmann, J.

**Nahrung** 15 (8) 837-857 (1971) [13 ref. De, en, ru] [Sektion Nahrungsgüterwirtsch. und Lebensmitteltech., Biochem. und Reaktionskinetik der Lebensmittel, Humboldt-Univ., Berlin, German Democratic Republic]

Values for the stimulating effects of various light intensities and concentrations of odour and flavour components are correlated with the relevant degrees of sensitivity by means of mathematical formulae. The study started from 7 different scales for grading (scales of "absolute" and "relative" values, respectively; "arithmetic", "geometric",



"logarithmic", "hedonic" and "classifying" scales). Clear-cut relations between stimulating effects and sensitivity values were obtained with the first 5 scales. The validity of these equations is at present established for light stimuli. IN

6 A 300

[Basic concepts of sensory analysis.]

Villalobos Cruz, M.

*Revista del Instituto de Investigaciones*

*Tecnologicas (Bogota)* 13 (73) 29-45 (1971) [9 ref. Es]

7 G 342

**Sensory evaluation of commercial soy flours, concentrates, and isolates.**

Kalbrener, J. E.; Eldridge, A. C.; Moser, H. A.; Wolf, W. J.

*Cereal Chemistry* 48 (6) 595-600 (1971) [16 ref. En] [N. Regional Res. Lab., Peoria, Illinois 61604, USA]

Flavour is one of the main factors limiting wider use of soybean products in foods. To determine the nature of the flavours and their intensities, various commercial soybean flours, concentrates, and isolates were evaluated by a 17-member taste panel. 2% dispersions of the samples in charcoal-filtered tap water at room temp. were rated for odour and flavour intensity on a 10-point scale where 10 is bland and 1 is strong. Odour scores ranged from 5.8 to 7.7; and flavour scores, from 4.2 to 7.0. Odour and flavour responses varied for different samples. Odour responses included beany, corn meal, musty, and toasted. Flavour descriptions included beany, bitter, chalky, and astringent. Sample detection thresholds were determined for a raw, defatted flour (laboratory prepared), a concentrate, and 2 isolates. Beany and bitter flavour thresholds were also determined on the same 4 samples. The data indicated differences in the various samples but that none were truly bland. The threshold values showed that the flavour constituents are detectable in very low concn. AS

7 H 1010

**Correlation between hedonic ratings and consumption of beer.**

Sidel, J. L.; Stone, H.; Woolsey, A.; Mecredy, J. M. *Journal of Food Science* 37 (2) 335 (1972) [1 ref. En] [Dept. of Food Sci., Stanford Res. Inst., Menlo Park, California 94025, USA]

Using a 9-point hedonic scale, 8 judges evaluated 4 different beer samples before ad lib. sample consumption for 1 h. The correlation between mean hedonic ratings and amounts of beer consumed was +0.81. These results support previously reported research in which hedonic ratings of food names were correlated with consumption. IFT

7 J 1132

**Sales pattern changing - colour may be factor.**

Elbe, J. H. von; Johnson, C. E.

*Canner/Packer* 140 (8) 10-11 (1971) [1 ref. En] [Dept. of Food Sci., Univ., Wisconsin, USA]

Per capita consumption of canned peas as % of total pea consumption declined from 86.5% in 1948 to 69.2% in 1969. Colour of (i) frozen peas, (ii) canned peas, (iii) canned peas, dark seeded variety and (iv) artificially coloured canned peas was evaluated using a 7-point hedonic scale (excellent = 7, very poor = 1). Average colour preference values obtained were: (i) 5.87, (ii) 2.71, (iii) 2.51, and (iv) 4.34. These correlated well with Hunter Colour Difference Meter  $a_L$  values: (i) -17.7, (ii) -3.5, (iii) -2.6, and (iv) -10.5. These results showed that panelists preferred a green colour as represented by frozen and artificially coloured peas. Influence of colour on texture, flavour and overall score was investigated by determining % changes in preference scores of canned and frozen peas when evaluated first in absence of colour differences and second in the presence of colour difference. Average texture preference score decreased by 7.9% for (ii) and increased 5.9 and 4.0 for (i) and (iv) respectively. Flavour preference scores increased by 2.8, 5.5 and 18.5% for (ii), (i) and (iv) respectively, overall scores decreased by 4.9% and increased 5.5 and 11.8% respectively. The significant percentage increase in flavour, texture and overall preference score for (iv) illustrates the importance of colour in the preference of peas. VJG

7 T 380

**Flavor problems in food development. II. Flavoring.** Katz, M. H.

*Food Product Development* 4 (6) 58, 62, 64 & 66 (1971) [6 ref. En]

Functions of flavouring ingredients as identifiable flavours and as unidentifiable supplements in foods are discussed. Masking or disguising undesirable flavour by utilising that flavour effect as a facet of total flavour profile is described. Effects of non-flavouring ingredients on flavour resolution and alterations of the overall impression of a flavour by balancing the taste-odour impression of a flavour by balancing the taste-odour interaction are illustrated. Techniques for evaluating flavouring effectiveness and pitfalls to guard against in tasting tests are described. The usefulness of a flavour ingredient is measured by its flavour reaction and effect in the food system and it is possible that one desired flavour characteristic can be achieved by several flavouring ingredients. Understanding of the multi-faceted characteristics of flavouring components and using these properties is probably the greatest skill a flavourist can achieve. When a flavouring system has been developed the judgement of the flavourist or food technologist should be confirmed by using a sensory panel and possibly a consumer panel to evaluate in-home performance. MGF



7 T 390

**[Sensory characterization of spices.]**

Przedziecka, T.; Baldwin, Z.

*Roczniki Instytutu Przemysłu Miesnego* 8 (2) 45-56 (1971) [17 ref. Pl, ru, en] [Inst. Przemysłu Miesnego, Warsaw, Poland]

Sensory evaluation of locally grown marjoram, basil, tarragon, caraway seed, and fresh and dried garlic, and imported black pepper, Cayenne pepper, allspice, nutmeg and sweet pepper, as well as model mixtures of black pepper, garlic and marjoram in different proportions was carried out by a panel of 6-10 experts using classic and staircase and double staircase methods [see Woskow. *Tech. Q.* (1967) 4: 1] for assessment of (i) taste and (ii) aroma. The freshly comminuted spices (particle size, 0.4-0.5 mm) were suspended in 2.5% gelatin solution and the gels, solidified by cooling in ice water, were brought to room temp. for testing. Threshold (i) and (ii) values and difference values are presented and discussed in detail. Dried garlic, allspice and fresh garlic showed the highest threshold intensities of (ii), 0.00107-0.0020%; and marjoram showed the lowest, 0.0270%; black pepper, basil and tarragon were intermediate at 0.0137-0.0157%. (i) threshold of black pepper was 0.0076% vs. 0.0026% for Cayenne pepper. Difference threshold ranges were 0.002-0.111% for (i) and 0.013-0.023% for (ii). In model mixtures, increase in marjoram proportion had a masking effect on garlic aroma but no effect on black pepper aroma. [See also FSTA (1972) 4 7S864]. SKK

8 A 343

**Review of (taste) panel screening tests and test methods.** [A lecture.]

Mesman, R.

*Tidsskrift for Hermetikindustri* 56 (11) 289-290 & 292-295 (1970) [En] [IFF, Hilversum, The Netherlands]

8 A 364

**[Sensory analysis of food texture.]** [A review]

Köster, E. P.

*Voedingsmiddelentechnologie* 3 (8) 23-24 (1972)

[4 ref. Nl] [Psychologisch Lab., Rijksuniv.

Utrecht, The Netherlands]

8 P 1165

**[Special No: Activity of dairy laboratories.]**

Anon. (Lenoir, J.; Veisseyre, R.; Dehove, R.-A.; Luquet, F. M.; Alais, C.; Chevalier, R.)

*Revue Laitière Française* 1972 (297) 243-307 (1972) [Fr]

This issue contains a number of brief articles by different authors on various aspects of dairy laboratories and their activities, dealing with organization, services to producers and processors, organoleptic testing, control of composition of dairy products, research and development, new products

etc. Included are accounts on Activities of technological laboratory at Grignon, by J. Lenoir & R. Veisseyre (pp. 271-275); Control of dairy products in the laboratory, by R.-A. Dehove (pp. 279-280); Consulting laboratory in the service of the dairy industry, by F. M. Luquet (pp. 283-287); Biochemical research at the University of Nancy, by C. Alais (pp. 295-299); and Dairy research carried out at the microbiological department of the National Agricultural Institute Paris-Grignon, by R. Chevalier (pp. 303-307). FL

8 S 959

**[Determination of the storage life of deep-frozen foods, particularly meat, meat products and ready-to-serve meat dishes.]** Die Bestimmung der Haltbarkeit von tiefgefrorenen Lebensmitteln, speziell von Fleisch, Fleischwaren und Fleischfertiggerichten.

Gutschmidt, J.

*Fleischwirtschaft* 51 (3) 295-299 (1971) [24 ref. De, en, fr] [Bundesforschungsanstalt für Lebensmittelfrischhaltung, 7500 Karlsruhe 1, Engesserstrasse 20, German Federal Republic]

If deep-frozen meat products are date-marked, it is necessary to know: the time-temp. tolerance of the product; temp. at stages within the freezer-chain; time the product is kept under these temp. conditions; and the permissible decrease in quality during frozen storage and transport. Sensory characteristics, along with suitability, mainly determine the selling value of a food. General use of a 9 score scale for taste panel assessments and methods of performing tests are suggested. Taking as an example a deep frozen pork chop, of which the keeping time is limited by the change in flavour, the decrease in flavour quality at storage temp. of -12° to -30°C was determined. Depending on these results, time-temp. curves were drawn for different quality requirements at the time of sale (high quality life, fair saleability, limit of saleability). The keeping time of the product within a particular freezer-chain was calculated. A satisfactory determination of the keeping time of a frozen product in a freezer-chain is only possible via analysis of the behaviour of individual properties determining quality, and evaluation of the components which limit the storage time. AS

8 S 1021

**Effects of castration and slaughter weight on fatness, cooking losses and palatability of lamb.**

Kemp, J. D.; Shelley, J. M., Jr.; Ely, D. G.; Moody, W. G.

*Journal of Animal Science* 34 (4) 560-562 (1972) [11 ref. En] [Univ. of Kentucky, Lexington, 40506, USA]

60 lambs (30 wethers and 30 rams) were fed in equal numbers and sexes to slaughter wt. of 36, 45 and 54 kg. The wether lambs were fatter, the roasts had more drip loss and less evaporative loss during cooking and the meat had higher flavour, tenderness and overall satisfaction scores than meat from rams. Shear data verified the panel tenderness results. As lambs became heavier, they were fatter,



roasts had more drip loss and total cooking loss, were more desirable in juiciness, tenderness and overall satisfaction and were more tender as measured by Warner-Bratzler shear. Meat from ram lambs, although significantly lower in palatability and tenderness than meat from wether lambs, was still highly acceptable. [See also FSTA (1970) 2 8S663.] AS

8 S 1047

**Meat texture. I. Subjective assessment of the texture of cooked beef.**

Harries, J. M.; Rhodes, D. N.; Chrystall, B. B. *Journal of Texture Studies* 3 (1) 101-114 (1972) [43 ref. En] [Meat Res. Inst., Langford, Bristol, UK]

69 beef roasts from different breeds, ages, growth histories and joints, were judged for texture, hot or cold, by a panel of 12 tasters. The panel was selected for discrimination and consistency over a series of training sessions during which a descriptive score sheet was developed through repeated discussion. 8 characteristics were decided upon to describe the texture of roast beef; 7 on scales (resistance, wetness, juiciness, cohesiveness, hardness, overall texture, chew count) and 1 qualitative (adjectival descriptions). The panel average scores for the 7 quantified characteristics were subjected to factor analysis and the loss of information involved in reducing the matrices to 2 dimensions was 6.3% (hot tasting) and 4.6% (cold tasting). Factor scores calculated for both sets of data agreed in being highly correlated ( $0.98 > r > 0.90$ ); Factor 1 with 'resistance', 'cohesion', 'hardness', 'overall texture' and 'chew count' and Factor 2 with 'wetness' and 'juiciness', but poorly with any characteristic in the other group ( $0.11 > r > 0.03$ ). Thus, the texture of roast beef was appreciated by this panel in 2 characteristics describable as 'toughness-tenderness' and 'juiciness', and the more elaborate scoring system originally devised did not add appreciably to the precision of measurement. Comparison of factor scores on samples tasted both hot and cold showed that the relative toughness-tenderness was maintained between samples under both conditions, whereas juiciness was not. AS

9 A 389

**Sensory good sense.**

Hirsh, N. L.

*Food Product Development* 5 (6) 27-29 (1971) [En] [Foods Div., Coca-Cola Co., Houston, Texas, USA]

Aspects covered include: integration of sensory testing into the work programme; academic and practical/applied approach to the subject; sensory tests and decisions; objectives for each test; reliability and validity; qualitative and quantitative mismatching; psychology of questionnaire design; psychology of effects (halo and contrast effects); and psychology of concepts and prototypes. VJG

9 A 398

**Food theory and applications.** [A book]

Paul, P. C.; Palmer, H. H. (Editors) xiv + 797pp. ISBN 0 471 67250 5 (1972) [Numerous ref. En]

Planning and conducting experiments, by D. L. Harrison (pp. 701-725, 29 ref.); Sensory methods in food-quality assessment, by H. H. Palmer (pp. 727-738, 41 ref.); and Physical and chemical tests of food quality, by M. Jacobson (pp. 739-777, 98 ref.). A 19pp. subject index is also included, with some relevant conversion tables. SAC

10 A 445

**[Sensory evaluation of foods.]** Sensorische Beurteilung von Lebensmitteln. [A book]

Kiermeier, F.; Haevecker, U. 101pp. ISBN 3 8070 0284 7 (1972) [1135 ref. De] Munich, German Federal Republic: J. F. Bergmann, Price DM 18.00 [Milchwissenschaftliches Inst., Tech. Univ., Munich, German Federal Republic]

This soft-cover book is basically a revised and expanded version of 3 articles published earlier [see FSTA (1970) 2 4A159, (1971) 3 1A15 & 3A148]. It is divided into the following sections: General section (including a critique of the position in the German Federal Republic and proposals for an improved technique), specific characteristics of individual foods (divided into 9 categories), examples of sensory tests, aids for the tester, and the literature. A series of appendices give data on aspects of statistical evaluation, and a 2-pp. subject index is included. HBr

10 G 487

**The effects of thawing and heating methods on selected parameters of palatability, wholesomeness, and nutritive value of frozen prepared foods.**

Harwood, V. E.

*Dissertation Abstracts International. Section B. The Sciences and Engineering* 32 (10) 5857-5858: Order no. 72-12 724 (1972) [En] [Univ. of Maryland, College Park, USA]

The effects of 5 heating systems (conventional range oven, compartment steamer, microwave oven, forced air convection oven and IR oven) on the quality of frozen beef stew, creamed spinach and chicken and noodle casserole were determined. Palatability was evaluated by a taste panel and by objective determination of colour and texture. Wholesomeness was evaluated by microbiological tests on samples heated to surface and centre temp. of 77°C. Protein quality was evaluated by microbial assay with *Tetrahymena pyriformis*. Results showed that no one system is best for heating all types of frozen food. Conventional equipment required the longest heating times; newer, faster equipment had detrimental side-effects (dehydration, scorching and burning). The taste panel preferred samples heated in the conventional oven; taste factors were more important than appearance. End-point internal temp. had the greatest effect on microbiological



safety; protein quality was improved by heating, the original products being slightly undercooked.  
AJDW

10 G 498

**[New horizons for snacks.]**

Anon.

**Industrie Alimentari** 11 (4) 65-73 (1972) [It]

Resumes are given of a seminar held in Solingen in Feb. 1972, on various aspects of the development of snack foods. They include: Socio-economic trends and their importance in the marketing of convenience foods, by -. Dotti; Equipment for extruding food products, by H. Luben; Food extrusion processes, by E. Kropp; Proteins and snack foods, by V. V. Kadane; Consistency of snack foods, by J. W. Mansvelt; Aroma of the potato; production of crisps with various flavours, by S. S. Chang; Oils and fats for frying purposes, by H. N. Bosschieter; Protection of oils and fats against autoxidation, by J. P. Ostendorf; Aromatic compounds, by G. W. Brokhuis & W. R. Abbink; Equipment for continuous production of crackers, sticks and pretzels, by J. A. Hanner; Techniques of sensory evaluation, by M. P. Dixon; Crackers and food aerosols, by K. H. Försterling; Packaging of crackers, by S. J. Palling; and Microbiological quality of small-size foods, by D. A. A. Mossel.  
HBr

11 A 465

**Use of the sign test in sensory testing.**

Gacula, M. C., Jr.; Moran, M. J.; Reaume, J. B.  
**Food Product Development** 5 (6) 98, 100, 102, 104 & 106 (1971) [14 ref. En] [Food Res. Lab., Armour & Co., Oak Brook, Illinois, USA]

Studies carried out to illustrate the use of the sign test in taste testing work and to extend the critical values of the test are described. Assumptions and limitations of the test are discussed. VJG

11 H 1638

**Training tasters to recognize flavour faults in beer.**

Zürcher, C.  
**Wallerstein Laboratories Communications** 34 (115) 199-200 (1971) [En] [Versuchs- und Lehranstalt für Brauerei, Berlin, Germany]

A test series of 8 aroma components of beer namely, dimethyl sulphide, diethyl sulphide,  $\beta$ -phenylethyl acetate, isoamyl acetate, 3-methylbutan-1-ol, caprylic acid, diacetyl and o-chlorophenol was prepared. These components gave rise to flavour complaints when present in sufficient concn. Each substance was dissolved in water or an alcohol/water mixture so that addition of 1 ml to normal clean-flavoured beer changed the smell and flavour characteristically. This series was designed to assist in training personnel responsible for quality control. Characteristic smell and taste impressions of these 8 components are described.  
VJG

11 H 1697

**Organoleptic evaluation of iso-alpha acids and other hop bittering substances.**

Todd, P. H.; Bensinger, M. G.; Johnson, P. A.; Worden, L. R.

**Proceedings. American Society of Brewing Chemists** 1971: 9-14 (1971) [8 ref. En] [Kalamazoo Spice Extraction Co., Kalamazoo, Michigan, USA]

The method, which times duration of the bitterness sensation as well as ranking intensity of bitterness, is fully described. The procedure was found to be substantially more sensitive than the triangulation method. The work also suggests that there can be wide actual differences in beer bitterness levels at the same apparent bitterness level, due to variations in the amounts of iso- $\alpha$ -acids and less bitter hop substances which assay as iso- $\alpha$ -acid in the ASBC quick method. PG

12 A 522

**Mechanical-rheological-textural characteristics of food materials.**

Bajjal, M. D.

**Abstracts of Papers. American Chemical Society** 164: AGFD 37 (1972) [En] [Four Walnut Street, Rye, New York 10580, USA]

The mechanical-rheological-Textural (MRT) characteristics of food materials may be conveniently defined in terms of load-deformation-flow behaviors provided only the mechanical character of texture is included. Both objective and subjective experiments are required for a full understanding of the MRT characteristics. Objective experiments are conducted on fundamental instrumentation capable of monitoring and varying load and deformation parameter on the test material. Objective experiments yield mechanical-rheological data. Subjective experiments involve direct consumer evaluation and may also involve evaluation by instrumentation which is a laboratory simulation of mastication process. Subjective experiments yield texture data. MRT characteristics have been understood as modifications of classical bodies behaviors. The process of mastication involves larger deformation, and correlation between objective and subjective data is difficult to establish. Despite these difficulties a knowledge of MRT characteristics is useful in product and process development for the creation of suitable organoleptic qualities in foods. This paper will attempt to present a review of MRT characteristics of food materials. AS



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## 1 A 5

Psychophysical measures of texture. [Review] Moskowitz, H. R.; Drake, B.; Åkesson, C. *Journal of Texture Studies* 3 (2) 135-145 (1972) [26 ref. En] [Pioneering Res. Lab., US Army Natick Lab., Massachusetts 01760, USA]

Psychophysical measurement seeks functional relations between instrumentally measured quantities and subjective perceptions. The review concerns the sequence of operations needed to construct meaningful scales for dimensions of perceived texture. Initial investigations require delimitations of the range of texture description in order to select 'fundamental' perceptual dimensions. Once dimensions such as subjective hardness or viscosity are selected, the next step is to develop an appropriate scale of magnitude. Placing products into verbal categories or into an ordinal arrangement cannot provide the necessary scale. However, when a scale is set up so that differences or ratios of scale values are meaningful, then an equation can be chosen to describe perceptual strength as a function of physical intensity. By constructing valid scales of perceived texture, it is possible to expand the applications of sensory scaling to encompass the optimization of products and the quality control of food materials under development. AS

## 1 A 44

[New methods for the evaluation and analysis of organoleptic qualities of foodstuffs and for the forecast of their changes. 4. Organoleptic scales for odour and flavour concentrations.] Neue Methoden der Be- und Auswertung sensorischer Eigenschaften von Lebensmitteln und der Berechnung ihrer Veränderungen. 4. Sensorische Skalen für Geruchs- und Geschmackskonzentrationen. Herrmann, J.

*Nahrung* 16 (3) 205-213 (1972) [4 ref. De, en, ru] [Sektion Nahrungsgüterwirtschaft & Lebensmitteltechnol. der Humboldt-Univ. zu Berlin. Bereich Mikrobiol. & Biochem., GDR]

General mathematical derivations of the exponential for the relationships between the sensitivity values of the "absolute" and "logarithmic" scales and the concn. of odour and flavour components (Weber-Fechner law) are discussed. Aqueous sucrose solutions served to demonstrate that these equations fit well. From the threshold concn. a quantitative relationship between the concn. and the degrees of sensitivity, provided that the judges are adequately trained and that the results obtained are statistically evaluated can be established. Thus, under certain conditions, organoleptic testing may be used as an analytical tool, the derived equations being used for the quantitative determination of the concn. of the odour and flavour components. [See FSTA (1972) 4 6A297 for part III.] IN

## 1 A 45

[New methods for the evaluation and interpretation of organoleptic qualities of foodstuffs and for the forecast of their changes. 5. Organoleptic "relative" scales for sucrose and common salt concentrations, and calculation of the "relative" sweetness.] Neue Methoden der Be- und Auswertung sensorischer Eigenschaften von Lebensmitteln und der Berechnung ihre Veränderungen. 5. Sensorische "relative" Grössenskalen für Saccharose- und Kochsalzkonzentrationen sowie die Berechnung der "relativen Süßigkeit" von Zuckern. Herrmann, J.

*Nahrung* 16 (3) 215-233 (1972) [6 ref. De, en, ru]

The applicability the author's equations to organoleptic studies published by other authors is studied. The hitherto unexplained fact that, at high concn., the organoleptic grading of sweetness and saltiness does not respond to an exponential function is shown to be a logical inference from the new theory. Hence it follows that, above or below a certain concn., the judge uses the "relative" or the "logarithmic" scale. A relationship, established by other authors, according to which the logarithms of sucrose concn. are, at equal sweetness, proportional to the logarithms of the concn. of another sweetening agent is deduced. The calculation of "relative" sweetness of sweetening agents from the data ([S-] and r-values) for the individual agents is described. IN

## 1 H 56

[Quality by tasting.] Qualität durch Verkostung. Riemann, J.

*Brauwelt* 112 (66) 1350-1357 (1972) [9 ref. De, en, fr] [Wicküler-Küpper-Brauerei KGaA, Wuppertal, Federal Republic of Germany]

Theoretical principles of tasting are given in which general conditions and special tasting procedures are described. Advice on assessing the aroma and flavour of quality beers is given. The practical training of the taster is considered. Basic types of flavour are presented and methods for reviewing the ability of the taster to detect odour and flavour are described. A number of flavour components present in beer and the preparation of the most suitable test solutions of these components are outlined. TUB-IGB

## 1 H 84

[Fruit juice quality.] Qualitätsfragen bei Fruchtsäften.

Daepf, H. U.

*Schweizerische Zeitschrift für Obst- und Weinbau* 107 (18) 538-549 (1971) [De] [Obstverband, Zug, Switzerland]

Definition of fruit juice quality is difficult, but broadly speaking a balance must be struck between requirements of the consumer and maintenance of natural fruit qualities. Tests on taste evaluation and aroma discrimination in respect of apple juices and on the effectiveness of sampler training are recorded, and the results are discussed of test series to find constituent characteristics of the fruits and





juices that directly or indirectly affect taste evaluation, thus enabling panel sampling to be replaced by mechanical sampling. Positive characteristics, rather than the (better known) characteristics indicating poor fruit or processing, were sought. These include sugar content and sugar-acid ratio, especially taken together; many other characteristics, however, provided no guide. There was a link between evaluation by aroma and that by taste. The extent of possible improvement of fruit juice quality in Switzerland and some factors involved are discussed. MJD

### 1 J 36

**Predicting hedonic ratings of raw carrot texture by sensory analysis.**

Schutz, H. G.; Damrell, J. D.; Locke, B. H. *Journal of Texture Studies* 3 (2) 227-232 (1972) [7 ref. En] [Dept. of Consumer Sci., Univ. of California, Davis, USA]

A trained panel was used to evaluate degrees of flexibility, hardness, chewiness, and juiciness, while an untrained panel indicated hedonic values for texture on a rating scale. A multiple regression analysis showed that 83% of the variation in the hedonic ratings could be accounted for by sensory scores on flexibility, hardness, and chewiness. AS

### 2 A 103

**[Mathematical-statistical evaluation of sensory scoring.]**

Örsi, F.

*Élelmézesi Ipar* 26 (2) 41-46 (1972) [12 ref. Hu, ru, de, en]

The elaboration of the scientific scoring system for the evaluation of food quality requires a correct choice of quality characteristics expressing the value of palatability, the proper weighting of these special characteristics and a standardization of the scoring system chosen for their sensory evaluation. The discrimination analysis for weighting quality properties is shown on examples which demonstrate the proper mathematical-statistical methods determining the most suitable weights for grading. From the density function of the various scoring scales it could be proved that the deviation from the normal distribution decreases with increasing length of the scale and that the most often used scores depend also on the scattering of product-quality values. AS

### 2 H 225

**[General report of work carried out in 1969 by the technical experimental centre of the Institut Technique du Vin. Oenology Commission meeting at Colmar, 6 April, 1970.] [Conference proceedings]**

Loustaunau de Guilhem, -.

*Vignes et Vins* 191, 9-15, 17-19, 21-27, 29-34 (1970) [Fr]

This report is divided into 6 chapters: control of maturation; oenological techniques (including enrichment of must and wines, heat treatment during wine making (by C. Olivieri), problems with

pesticides and herbicides in fermentation, biological deacidification, problems in must and wine treatment, and new materials and new methods); continuous vinification experiments in 1969 (by C. Foulonneau); experimental vinification; studies of various problems; and taste tests. JA

### 2 J 323

**Estimation of methionine in black-gram (*Phaseolus mungo* Roxb.) green-gram (*P. aureus* Roxb.) and soybean (*Glycine max* (L.) Merr.).**

Kapoor, H. C.; Srivastava, V. K.; Gupta, Y. G. *Indian Journal of Agricultural Sciences* 42 (4) 296-299 (1972) [10 ref. En] [Indian Agric. Res. Inst., New Delhi]

A simple and rapid chemical method for the estimation of methionine in pulses and soybeans is described. Values obtained were reproducible and did not differ when tested statistically; recovery was also satisfactory ranging from 84-88%. In soybean the methionine content on average was 0.44-0.53% in the seed and 1.02-1.43% in the protein fraction. In black-gram the methionine content was 0.29-0.41% in the seed and 1.21-1.57% in the protein fraction, and in green-gram 0.27-0.47% and 1.05-1.51%, respectively. Correlation studies showed a significant positive relationship between % methionine and % protein in the seed. AA

### 3 A 144

**Proceedings of International Symposium on Sensory Evaluation of food. Principles and Methods.**

Drake, B. (Editor)

*SIK Rapport* No. 268, 56pp. (1969) [En]

Summaries of papers read at the Symposium, held in Kungälv, near Göteborg, Sweden, in Sept. 1968, include: Computer programs for use in sensory evaluation, by P. W. M. John; Theories of sensory thresholds, by J. A. Swets; The physiology of touch, by U. Lindblom; Aspects on electrophysiological recordings from taste nerves, by G. Hellekant; A hypothesis as to the mechanism of the sense of smell, by A. J. P. Martin; Sensory relatedness between odours, by K. B. Doving; Cross adaptation of odours, by E. P. Köster; Abnormalities of taste associated with altered metabolic states, by R. I. Henkin; Characterisation and classification of sensory qualities, by R. Harper; Palatability and sensory evaluation, by J. Le Magnen; Selection and training of subjects, by N. B. Pikeina; The sensory evaluation laboratory, by D. A. Brandt; The dilution method as an analytical tool, by D. J. Tilgner; Factors influencing responses to chemical and physical stimuli, by R. M. Pangborn; Evaluation of olfactory thresholds according to the decision theory, by G. Teatini; Determination of qualities of odour, by A. Turk; Appearance in food testing, by A. C. Little; Sensory methods of estimating texture, by J. J. Connell; The relevance of correlating objective and subjective data, by A. Kramer, (continued in following abstracts) HBr





3 A 115

Proceedings of International Symposium on Sensory Evaluation of Food. Principles and Methods.

Drake, B.

*Stk Rapport* No. 268, 56pp. (1969) [En]

(Continued from preceding abstr.) GLC data and their relationship to aroma, by E. L. Wick; Correlations between aroma determination by humans, frogs and GLC, by E. von Sydow; Hygroscopic equilibrium and texture in relation to thermodynamics and mechanics in freeze-dried foods, by J. G. K. Salis; Food texture controlled by recording of mastication movements, by A. Pierson; Food crushing sounds, by B. Drake; A systematic literature classification in sensory analysis, by G. Jellinek; The utilization of sensory evaluation in product development, by H. G. Schutz. HBr

3 A 146

Consistency of foodstuffs. [Book]

Sone, T.

x+188pp. ISBN 90 277 0219 5 (1972) [many ref. En] Dordrecht, The Netherlands, D. Reidel Publishing Co. Price f57.00

This translation of an original first published in Japanese in 1966 covers the subject under the chapter headings: What is food consistency? (pp. 1-6, 6 ref.); Objective measurements of consistency (pp. 7-49, 30 ref.); Consistency of respective foods (milk, syrups, juices purees, gels, egg white, rennet milk, kamaboko, vegetables, fruits, meat, meat products, potatoes, rice, macaroni, spaghetti, udon (noodles), fats, ice cream, powders) (pp. 50-148, 146 ref.); Abnormal flow properties of foodstuffs (condensed milk, fats, candy, butter) (pp. 149-158, 14 ref.); Sensory assessment of firmness (pp. 159-170, 9 ref.); and Application of consistency in food technology (pp. 171-178, 8 ref.). An author index and subject index are provided. JN

4 A 175

[The effect of the different environment on the taste. I. Effect of environment and illumination.]

Saito, S.; Takama, F.; Toyomaki, T.

*Japanese Journal of Nutrition [Eiyogaku Zasshi]* 30 (4) 165-168 (1972) [9 ref. Ja, en] [Dept. of Nutr., Tokyo Univ. of Agric., Japan]

The effect of environmental conditions on the performance of Duo-trio taste panel tests is examined: a special room in which temp., illumination and sound conditions could be controlled was used. Test performance (accuracy) was significantly improved in a comfortable environment as opposed to an uncomfortable one. Illumination was the most significant factor. [From En summ.] JN

4 A 216

Taste.

Heath, H. B.

*Nutrition and Food Science* No. 24, 14-16 (1971) [En]

Some of the problems associated with each of the prime taste sensations (salt, sweet, sour and bitter), how they are affected by external conditions and how the effects are interrelated, are discussed. It is noted that these conditions must affect any approach to flavouring problems. AA

4 A 228

Data analysis: interblock and intrablock estimates of variance on taste panel data.

Gacula, M. C., Jr.; Kubala, J. J.

*Journal of Food Science* 37 (6) 832-836 (1972) [10 ref. En] [Food Res. Lab., Armour Food Co., 801 West 22nd St., Oak Brook, Illinois 60521, USA]

This work was conducted to assess the importance of interblock and intrablock information in the analysis of sensory panel scores. The data from three studies designed as a balanced incomplete block with repetitions was obtained as a model for the study. The result shows that the variance is reduced by interblock and intrablock recoveries. However, the absolute reduction in variance is not large enough to effect changes in the interpretation of result. An intrablock analysis of panel scores is therefore sufficient. A numerical illustration of the interblock and intrablock analyses of data is presented. IFT

4 A 230

A question of taste.

Heath, H. B.

*Nutrition and Food Science* No. 23, 6-8 (1971) [En]

The appreciation of taste, as distinct from that of flavour, is discussed with reference to: the taste buds; stimulation and response; the primary or cardinal tastes, i.e. salt, acid, sweet and bitter; sensitivity of response; and electro-physiology. AA

4 A 231

Sensory evaluation using composite complete-incomplete block designs.

Cornell, J. A.; Knapp, F. W.

*Journal of Food Science* 37 (6) 876-882 (1972) [8 ref. En] [Statistics Dept., Univ. of Florida, Gainesville, 32601, USA]

The complete block (CB) and incomplete block (IB) designs presently used for sensory evaluation are inadequate for testing and measuring the panelists  $\times$  treatments ( $P \times T$ ) interaction (the difference in magnitude of variations in judgements). This testing is possible with a composite complete-incomplete (C-I) block design in which each CB is augmented with an IB; i.e., some of the samples in the former are replicated in the latter. Removal of the  $P \times T$  interaction allows the estimation of pure error in the analysis of variance. The use of pure error only, when





comparing sample effects, leads to a more efficient test than can be attained with the CB or IB designs. The efficiency increases as the ratio: mean square P  $\times$  T interaction/mean square error increases, provided the ratio remains nonsignificant. IFT

#### 5 A 276

Test methods and evaluation procedures for the determination of the sensory properties of foodstuffs.

Saray, T.; Urbanyi, Gy.; Dobray-Horvath, E. *Acta Alimentaria Academiae Scientiarum Hungaricae* 1 (3/4) 279-295 (1972) [20 ref. En] [Univ. of Hort., Dept. of Food Tech. & Microbiol., Budapest, XI., Menesi ut 45, Hungary]

Dried French beans irradiated with 0.15, 0.60 and 2.40 Mrad and cooked 5, 10 and 15 min respectively were tested for colour, odour, taste and texture using scoring and difference test methods of sensory analysis. Odour, colour and taste of 4 sour cherry juice samples and samples of mushroom paste were similarly evaluated. Data obtained were evaluated statistically. French bean samples irradiated with 2.40 Mrad did not differ from other samples except in colour when evaluated by Kramer's method. A significant difference was found with Kramer's method between samples irradiated with 0.15 Mrad and the control when 10 and 15 min cooking periods were used. Differences in SD of scores for the majority of parameters in French beans, and for taste scores of sour cherry juice, could not be confirmed by the variance ratio test. Colour, odour and taste scores of dried French beans were also evaluated by t-test. No significant difference was found by analysis of variance in colour of dried French beans, or in the taste and odour of sour cherry juices. Deviations, investigated by the triangular and duo-trio difference tests, were high for sour cherry juice. Significant differences found by panelists in triangle tests on mushroom pastes could not be confirmed by duo-trio tests. PG

#### 5 G 264

Human nutrition. Its physiological, medical and social aspects. [Book]

Mayer, J.

xv+721pp. ISBN 0 398 02359 X (1972) [many ref. En] Springfield, Illinois, USA, Charles C. Thomas. Price \$12.95 [Harvard Univ., Boston, Massachusetts, USA]

This collection of 82 essays, written by the author since 1959, is grouped into 10 sections as follows: Calories and needs for energy (pp. 11-73); Proteins, vitamins, minerals: needs for nutrients (pp. 75-144); The seven ages of man: from infancy to old age (pp. 145-281); Hunger and obesity (pp. 283-412); Inborn errors of metabolism and nutrition (pp. 413-453); Nutrition and disease (pp. 455-572); The safety of foods (pp. 573-587); Dietetics (pp. 589-625); The White House Conference, Hunger and Nutrition Policy (pp. 627-666); and Nutrition and the world (pp. 667-721). Essays include: Food composition tables: basis, uses and limitations (pp. 38-60, 16 ref.); Food allergies (pp. 518-524, 3 ref.); Low-sodium diets (pp. 536-

546, 2 ref.); Taste tests as diagnostic tools (pp. 564-569, 9 ref.); Food additives and nutrition: a primer (pp. 575-581, 5 ref.); and Food-borne diseases and consumer protection (pp. 582-587, 5 ref.). JA

#### 5 H 768

[Quality improvement in apple juices, concentrates and wines - experience and possibilities.] Zur Qualitätsförderung bei Apfelsäften, Apfelsaftkonzentraten und Apfelweinen - Erfahrungen und Möglichkeiten. [Lecture] Daepf, H. U.

*Flüssiges Obst* 39 (11) 474-480 (1972) [De]

The subject is covered under the headings: definition of quality; organoleptic evaluation (with practical examples of points systems); development of quality criteria for apple juice (with examples of correlation analysis); quality control and quality improvement in retail products (with practical examples); and quality control of fruit juice concentrates. HBr

#### 5 J 708

Relationship between certain physical-chemical measurements and sensory appraisals of apple texture.

Bowman, F.; Kylene, A. M.; Adam, S. F. *Journal of Texture Studies* 3 (4) 478-491 (1972) [18 ref. En] [Dept. of Food Sci. and Nutr., Colorado St. Univ., Fort Collins, 80521, USA]

Apples were selected as the test medium to provide information about the relative value of physical-chemical measurements as predictors of sensory appraisal of texture. Sensory, shear force, moisture, pH and protopectin/total pectin measurements of textural parameters for five variety-lots, after various periods, were treated by multiple regression, analysis of variance, and covariance and path analyses. Statistical treatments revealed relationships that were clearcut and certain trends that appear to be meaningful. Panel scores were not well predicted by objective measurements with one exception. Shear force was an excellent predictor for crispness of Colorado Red Delicious. Tenderness of Golden Delicious increased as storage increased and protopectin/total pectin decreased, whereas losses of crispness and juiciness were small and inconsistent. Overall results of sensory and physical-chemical tests for Winesap and Red Delicious were rather consistent in that tenderness increased and juiciness decreased linearly with the length of storage. AS

#### 5 L 352

[Quality control of confectionery products containing alcohol.] Qualitätskontrolle alkoholischer Zubereitungen.

Habersaat, F. C.

*Süßwaren* 14 (8) 355-358 (1970) [9 ref. De] Following earlier work on the testing of alcohol-containing fillings, aspects covered are the testing of the alcohol content, dry matter content, taste, and total-acid content of fillings as intermediate products and, by the same methods, in the final commodity, and also the testing of samples in the





preliminary selection of fillings for manufacture.  
[See FSTA (1970) 2 10L622 for previous part.]  
MJD

6 A 278

[Methodology and standardization of sensory analysis.]

Depledge, F.

*Annales des Falsifications et de l'Expertise Chimique* 65 (699) 105-112 (1972) [18 ref. Fr]

This article summarizes the principles of sensory evaluation of foods and outlines the advances being made in international standardization of methods of sensory analysis. A list is given of certain food standards which include organoleptic properties.

MEG

6 A 285

[Training of members of taste panels.] Zur Qualifizierung von sensorischen Gutachtern.  
Neumann, R.

*Bäcker und Konditor* 18 (12) 380-381 (1970) [13 ref. De] [Fachabteilung Nahrungsgüter des DAMW, Berlin (GDR)]

6 T 284

Classification and genesis of food flavours.

Ohloff, G.

*Flavour Industry* 3 (10) 501-508 (1972) [En] [Firmenich & Cie, 1211 Genève 8, Switzerland]

Food flavours may be divided into 9 classes which may be further subdivided for reason of clarity. The flavour classes (subdivisions in parentheses) are as follows: fruit (citrus-type, berry-type); vegetable; spice (aromatic, lachrymogenic, hot); beverage (unfermented, fermented, compounded); meat (mammal, seafood); fat; cooked (broth, vegetable, fruit); empyreumatic (smoky, broiled/fried, roasted/toasted/baked) and stench flavours. The formation of food flavours is discussed with reference to some typical examples: the action of thermal energy on lipids, carbohydrates, and carotenoids; and the dye-sensitized photo-oxygenation of polyenes. VJG

6 T 285

[Definition of basic terms in flavour research.] Zur Terminologie der Grundbegriffe der Aromaforschung.

Rothe, M.

*Nahrung* 16 (5) 475-481 (1972) [22 ref. De, en, ru] [Zentralinst. für Ernährung, Potsdam-Rehbrücke, Deutsche Akad. der Wissenschaften, German Democratic Republic]

7 A 344

Sensory perception of sweetness.

Pangborn, R. M.

*Abstracts of Papers, American Chemical Society* 165, AGFD 5 (1973) [En] [Food Sci. & Tech., Univ. of California, Davis, 95616, USA]

The problems of measuring sweetness are considered with reference to the influence of solution temp., pH, viscosity and the presence of

other substances on sweetness, and the variations amongst individuals in the perception of sweetness.  
AA

7 A 351

Biophysical basis of sweetness.

Beidler, L. M.

*Abstracts of Papers, American Chemical Society* 165, AGFD 4 (1973) [En] [Dept. of Biol. Sci., St. Univ., Tallahassee, Florida 32306, USA]

There exist many different types of receptor sites to which sweet stimuli may bind. Thus, the stimulus-response function differs from one sweetener to another. Likewise, sweetness of mixtures may be either greater or lesser than that predicted from the algebraic sum of the individual sweetness of the components. Taste modification may occur by the processes of competitive inhibition, binding constant modification and alteration of electrical charge of the taste receptor membrane. Relative effectiveness of ammoniated glycyrrhizin, sodium saccharin, sugars, sodium cyclamate, amino acids, L-aspartyl-L-phenylalanine methyl ester, and stevioside are discussed. AS

7 H 1058

[Sensory analysis of wines. I. Training programme for Spanish wine taste panel.]

Cabezudo, M. D.; Llaguno, C.

*Revista de Agroquímica y Tecnología de Alimentos* 12 (4) 636-643 (1972) [4 ref. Es, de, en, fr] [Inst. de Ferment. Ind., Madrid, Spain]

The wine taste panel training programme described involved scoring 21, 23 and 31 Spanish wines on Score Card No. 1 [Hilgardia (1961) 30 (19) 587-619] and 80 wines on Score Card No. 2 [Quaderni tecnici dell'Assoc. Enotecnici Italiani (1967) No. 1, 1-18]. Card No. 1 proved useful in training tasters to express sensations numerically; Card No. 2 allowed greater accuracy in describing discrete sensations. RM

7 S 814

Observations on the contribution of fat and lean to the aroma of cooked beef and lamb.

Pearson, A. M.; Wenham, L. M.; Crase, W. A.; McLeod, K.; Davey, C. L.; Kirton, A. H.

*Journal of Animal Science* 36 (3) 511-515 (1973) [12 ref. En] [Meat Ind. Res. Inst., PO Box 617, Hamilton, New Zealand]

Using triangle tests, both a trained and an untrained panel found it difficult to distinguish differences in aroma between heated lean extracts of beef and lamb. Either panel could readily ( $P < 0.001$ ) distinguish the aroma of the lean extract heated in the presence of rendered fat from the same species from the aroma of the lean extract alone, but were unable to identify the species from which the fat originated. Comparison of rendered and ground whole beef fat with rendered or ground whole lamb fat revealed that the panel was frequently unable to recognize any difference between species in aroma and were equally poor in





correctly identifying the kind of fat. Results suggest that the major species differences is aroma of heated lamb and beef do not arise from the lean extracts. Even though such differences appear to originate from the fatty tissues, they are extremely subtle and difficult to distinguish. AS

7 T 325

[Aroma compound threshold values and their use for evaluation of aroma analyses.]

Schwellenkonzentration von Aromastoffen und ihre Nutzung zur Auswertung von Aromaanalysen.

Rothe, M.; Wölm, G.; Tunger, L.; Siebert, H.-J. *Nahrung* 16 (5) 483-495 (1972) [40 ref. De, en, ru] [Zentralinst. für Ernährung Potsdam-Rehbrücke, Deutsche Akad. der Wissenschaften Berlin, German Democratic Republic]

The detection thresholds of 85 aroma compounds (alcohols, acids, esters, aldehydes, ketones, N- and S-compounds) were determined by a trained panel using triangular testing. Tap water was used as the dilution medium. Methyl mercaptan, ethyl butyrate, octanal, decanal, 2-methylbutanal, nonanol, diacetyl and ethyl propionate had low threshold values, whereas most acids and the first members of homologous series had high threshold values. IN

8 A 390

Expanded tables for determining significance of differences for ranked data.

Kahan, G.; Cooper, D.; Papavasiliou, A.; Kramer, A.

*Food Technology* 27 (5) 61, 64-65, 68-69 (1973) [3 ref. En] [Res. & Development Lab., McCormick & Co. Inc., 204 Wight Ave., Hunt Valley, Maryland 21031, USA]

In sensory evaluation of food products it is customary to rank a series of samples in order of preference and to calculate any significant differences by analysis of variance. However the calculations become very unwieldy as the number of samples and/or panel members is increased. Two tables prepared with the aid of a computer are given, which permit direct reading of significance, without calculations, for as many as 20 samples and 75 panel members (or replicates). One table is used to establish a 5% level of significance and the other if a 1% level is required; both tables also identify samples which are significantly low or high. The method is particularly useful for evaluation of data which do not have a normal distribution and when the actual values are not meaningful e.g. for a series ranked in order of preference or difference. Instructions for use of the tables are given. ELC

8 A 391

[Organoleptic analysis and qualitative characteristics for grading of foods.]

Sadini, V.

*Industria Alimentari* 12 (3) 128-132 (1973) [6 ref. It]

Various points systems for evaluating food organoleptic quality are discussed and compared. HBr

8 A 394

[The tetrad test as a suitable sensory method. I. Method and application.] Der Tetraden-Test als aussagefähige sensorische Methode. I. Methodik und Anwendung.

Renner, E.; Römer, G.

*Zeitschrift für Lebensmittel-Untersuchung und -Forschung* 51 (5) 326-330 (1973) [19 ref. De, en] [Milchwirtschaftliche Abteilung, Inst. für Tierzucht und Haustiergenetik, Univ. Giessen, Federal Republic of Germany]

The tetrad test (a development of the triangle test) is described, and recommended test procedures are given. Taste panel members are presented with 4 samples, one being a known standard. Of the other 3 samples, one or two are identical to the standard; the taste panellist has to identify the sample or samples which differ from the standard. The results of 150 trials (with 780 wrong judgements) showed that there was no significant tendency for panellists to favour any of the six possible answers. Instructions are given for statistical evaluation of the results. AJDW

8 A 395

[Mathematical-statistical analysis of the results of sensory tests.] Mathematisch-statistische Auswertung der Ergebnisse der sensorischen Punktbewertung.

Örsi, F.

*Lebensmittel-Industrie* 20 (3) 103-107 (1973) [12 ref. De, en, ru] [Tech. Univ., Budapest, Hungary]

Development of a score sheet for sensory evaluation of food quality is discussed, and application of discrimination analysis is described. It is shown that deviation from the normal distribution decreases with increasing scale length, and that the most frequently awarded score is dependent on the scatter of the quality characteristics. IN

8 G 424

[Guide to sensory evaluation of products of the soup industry by umpire analyses.] Leitfaden zur sensorischen Beurteilung von Erzeugnissen der Suppenindustrie bei Schiedsanalysen.

Jellinek, G.

*Deutsche Lebensmittel-Rundschau* 68 (12) 389-393 (1972) [De]

Sensory testing of soups, broths, gravies and seasonings is discussed, and recommendations are given for sample preparation and test conditions, procedures and equipment. Various sensory test methods are briefly discussed, including sample differentiation tests, tests in which samples are ranked in order of preference, descriptive evaluation tests, quality evaluation tests based on allocation of point scores, and profile and dilution-profile tests for individual flavour or aroma components. AJDW

8 H 1191

[The triangle taste test.] Führt die Dreieck-Kostprobe zu falschen Schlüssen?

Kotter, F.





*Schweizer Brauerei-Rundschau* 84 (4) 73-76 (1973) [4 ref. De]

Problems of sensory evaluation of beer by the triangle test are discussed, and a modified test method is recommended, in which series of 4 beer samples are presented to the test panel. 3 beers are tested in each series, with 1 sample of each of 2 beers and 2 samples of the remaining one. A method for evaluation of the test results is described, in which the scores awarded by each panel member are weighted according to the consistency of his evaluation of the duplicate samples. AJDW

8 H 1229

[Sensory analysis of fruit juices.] *Sensorische Analytik bei Fruchtsäften*. Neubert, K.-P.; Ach, G. *Flüssiges Obst* 40 (1) 25-28 (1973) [35 ref. De, en]

See FSTA (1972) 4 1H103.

8 J 1246

Effect of grape maturity, sample order, and sex of the taster on the flavor response of supermarket customers.

Nelson, K. E.; Allen, J. W.; Schütz, H. G. *American Journal of Enology and Viticulture* 23 (2) 86-95 (1972) [3 ref. En] [Dept. of Viticulture and Enology, Univ. of California, Davis, 95616, USA]

'Perlette' table grapes harvested at Indio, California, at 12-20° Balling (°B) and cooled immediately were flown to Chicago the next day. The cold berries were cut from the stems and separated with a graduated series of sugar solutions into maturity levels of 12, 14, 16, 18, and 20°B  $\pm$  0.5°B. The respective Balling-acid ratios were 11:1, 15:1, 17:1, 23:1, and 30:1. One berry of each level was presented to a customer in a Jewel Food Store in randomized order. A 9-point hedonic scale of 4 levels of "like" and "dislike" (extremely, very much, moderately, and slightly) and one of "neither" was feasible within the practical limit of 2-4 min. participant if the interviewer first established whether the response was "like" or "dislike", then the degree (extremely to slightly). For the 375 tasters interviewed acceptability increased markedly with °B. Further, tasters liked 20°B grapes more if they followed 12°B fruit, and disliked 12°B grapes more when they followed those of 20°B. Women showed a stronger dislike than men for lower-maturity berries, and at the same time a slightly stronger like than men for higher-maturity grapes. AS

8 S 1029

A statistical approach to the subjective and objective measurements of odors induced by  $\gamma$ -irradiation of beef fat.

Kozanic, N.; Duong, T. B.; Syreck, W. Y. *Journal of Food Science* 34 (1) 111-115 (1973) [22 ref. En] [Dep. of Eng. Sci., Univ. of W. Ontario, London, Canada]

subjected to  $\gamma$ -irradiation and the intensity of the odour induced by irradiation was studied. A statistical approach was developed to evaluate the organoleptic data obtained by taste panel evaluation and to correlate this data with the results obtained by chromatographic analysis of the irradiated samples. For this purpose, a step-wise multiple regression analysis was developed and this technique was analysed for validity and applicability. IFT

9 A 408

[Organoleptic and sensorial evaluation of foods: some qualitative parameters.]

Sadici, V.

*Industria Alimentari* 12 (4) 91-96, 98 (1973) [9 ref. It, en] [Univ. di Padova, Italy]

Properties of foods of importance for their organoleptic evaluation are discussed, with reference to their suitability for incorporation into a general classification scheme. HBr

9 A 410

Difference taste thresholds for sodium chloride among young adults: an interlaboratory study.

Johansson, B.; Drake, B.; Pangborn, R. M.; Barylko-Pikielna, N.; Köster, E.

*Journal of Food Science* 38 (3) 524-527 (1973) [14 ref. En] [Swedish Inst. for Food Preservation Res., S-400 21 Göteborg]

Difference thresholds expressed as jnd ('just noticeable differences') values or Weber ratios for taste of NaCl at 2 standard concn. were determined at 4 laboratories in 4 different countries using a method of constant stimuli. The total jnd values (Weber ratios) for the 4 laboratories were: 0.021% (0.070), 0.022% (0.073), 0.026% (0.087) and 0.031% (0.103) at the standard concn. of 0.30% NaCl; and 0.049% (0.062), 0.042% (0.053), 0.058% (0.073) and 0.097% (0.121) at the standard concn. of 0.80% NaCl. At both standard concn., the jnd values were in more or less close agreement for 3 of the 4 laboratories, whereas values for the fourth laboratory were significantly higher. The jnd values for females were generally slightly lower than for males. Difficulties encountered in interlaboratory comparisons are briefly discussed. IFT

9 A 418

Ranking in incomplete blocks. The use of the technique and the interpretation of the results.

Levitt, D. J.

*Journal of the Science of Food and Agriculture* 24 (6) 739-745 (1973) [4 ref. En] [Unilever Res. Lab., Colworth House, Sharnbrook, Bedfordshire, UK]

It is often more convenient or expedient [in sensory evaluation of foods] to obtain data in the form of rankings than in the form of scores or measurements. Analysis of such data has, however, been difficult to perform and to interpret except for the most simple experiments. The model described by Bradley and Terry [Biometrika (1952) 39, 324] provides a very useful analysis in the case of ranking by paired comparisons. A method of





analysis similar to the Bradley-Terry model, but dealing with ranking in incomplete blocks or complete blocks of any size, has been developed. The results of this analysis are readily interpretable and should enable more use to be made of ranking procedures. AS

9 A 421

**Effect of hydrocolloids on oral viscosity and basic taste intensities.**

Pangborn, R. M.; Trabue, I. M.; Szczesniak, A. S. *Journal of Texture Studies* 4 (2) 224-241 (1973) [21 ref. En] [Dept. of Food Sci. & Tech., Univ. of California, Davis, 95616, USA]

This study determined the effects of low concentrations of 5 food hydrocolloids on the taste intensities of aqueous solutions of sucrose, citric acid, NaCl, saccharin, and caffeine. The effects of the taste compounds on both oral and Brookfield viscosities were also measured. In general, sourness of citric acid and bitterness of caffeine were suppressed, while sweetness of saccharin was enhanced. Among the basic tastes, sourness was affected the most and saltiness the least. Except for sucrose, modification of taste intensity was independent of viscosity, and appeared to be related to the physicochemical properties of the hydrocolloid and the taste compound. About 16 cps were needed to reduce significantly the sweetness of sucrose. The taste compounds altered oral and physical viscosities differentially depending on the specific gum/taste combination. Generally, viscosity was reduced by the addition of all taste compounds except sucrose which increased the physical viscosity. AS

9 A 441

**Modern concept of food quality and its importance in future agricultural research in India. I.**

**Importance and modern concept of food quality.**

Rangi, A. S.; Jain, S. C. *Indian Food Packer* 26 (4) 24-27 (1972) [8 ref. En] [Dept. of Food Sci. & Tech., Punjab Agric. Univ., Ludhiana]

Quality of food is discussed with reference to: sensory attributes by which the consumer judges the product i.e. appearance, flavour, kinesthetic characteristics; hidden quality attributes, which includes those factors which may affect the saleability of a product from the standpoint of health, such as nutritive value and wholesomeness; and quantitative attributes which are of concern to the food processor, the package manufacturer, and the consumer. AA

9 U 626

**Guide for sensory evaluation of food. I. Optimum requirements.**

India, Indian Standards Institution  
*Indian Standard IS:6273 (I)-1971* 10pp. (1971)  
[En] [New Delhi]

9 U 627

**Guide for sensory evaluation of food. II. Methods and evaluation cards.**

India, Indian Standards Institution  
*Indian Standard IS:6273 (II)-1971* 34pp. (1971)  
[En]

10 A 471

**[Sensory evaluation of the texture of foods by the profile method.]**

Rojas de Sandoval, A. M.; Villalobos Cruz, M. A. *Revista del Instituto de Investigaciones Tecnológicas (Bogota)* 15 (81) 19-26 (1973) [6 ref. Es] [ITT, Bogota, Colombia]

Methodology, definitions, classification and reference scales for sensory evaluation of food texture are described. Characteristics considered include hardness, cohesion, viscosity, elasticity, adhesiveness, breakability, chewiness, gumminess, size, shape, structure, and properties related to the fat and moisture contents. RM

10 H 1573

**[The role of taste tests in quality control of beer.]**

Zum Thema Bierverkostung.  
Soltoft, M. *Brauwelt* 113 (47) 1015-1018 (1973) [9 ref. De, en, fr, es] [Alfred Jørgensen Gärungsphysiologisches Lab. AG, DK-1809, Copenhagen, Denmark]

Sensory testing of beer is discussed with reference to test procedures, improvement of the usefulness of taste panels, the relative merits of brewery staff and outside personnel as taste panellists, terminology of organoleptic testing, and the value of taste tests as a means of understanding organoleptic questions. Training of sales personnel as taste panellists is recommended. TUB-IGB

10 H 1539

**[Taste patterns of Japanese drinks.]**

Tamura, S.; Ishima, T.; Saito, S.; Miyauchi, T.; Tomita, F.; Yoshikawa, S. *Report of the National Food Research Institute [Shokuryo Kenkyusho Kenkyu Hokoku]* 27, 77-83 (1972) [3 ref. Ja, en]

A series of investigations on the taste characteristics (sweet, salty, sour, bitter, tasty and astringent) of 20 beverages is described. 30 taste panels were asked to allocate point scores to each beverage on the basis of their mental image of its taste characteristics; these 'taste patterns' were then compared. In a second study, the same 30 panels had to allocate point scores to the beverages on the basis of sensory evaluation. The scores based on mental and sensory evaluation were then compared, and generally showed a close correlation between the panellists' mental image of a beverage and its actual organoleptic properties. [From En summ.] AJDW

10 H 1686

**[The effect of temperature on the taste of food.]**





Testweinprobe zur Selektion geeigneter Rebsorten für den Anbau unter den extremen Bedingungen des Weinbaugebietes "Obermosel".

Schöffling, H.; Weiling, F.

*Wein-Wissenschaft* 28 (4) 203-209 (1973) [2 ref. De, en, fr] [Zentralstelle für Klonenselektion, Landes-Lehr- und Versuchsanstalt für Weinbau, Gartenbau und Landwirtschaft, Trier, Federal Republic of Germany]

It is suggested that organoleptic judgments of new varieties or clones of wine should be undertaken by ordinary consumers in addition to wine specialists when making marketing selections. To ensure statistical validity of results, each wine should be tested by randomized repetitions. In view of the limited experience of ordinary consumers, the number of wines tested on one occasion must be limited and the tests must be simple and not tiring, to ensure consistent results in repeat tests. It is therefore only possible to compare a limited number of vintages subjected to the same vinification conditions; different vinification treatments cannot be compared at the same time and these must be examined in further tests. As an example, data are given for a grading trial of 10 wine var. on 2 successive days by 11 specialists and 11 consumers (including 7 women); these show preference differences between experts and consumers for different var. and in ranking scores accorded to the same var. It is suggested that final judgments should also take into account the results of chemical analysis. ELC

10 H 1707

[Special sensory method for the evaluation of fruit juices.] Spezielle sensorische Prüfmethode zur Beurteilung von Fruchtsäften.

Neubert, K.-P.; Ach, G.

*Flüssiges Obst* 40 (4) 140-144 (1973) [23 ref. De, en]

Principle and application (to apple) of the "profile method" of analysing fruit juices (based on the principle of listing good and bad qualities in the order that the tester becomes aware of them, assessing their intensity, and mathematically determining "total quality"). "dilution profile analysis" (appreciation of qualities and intensity assessment with increasing dilution), and assessment of "time-intensity behaviour" (quality intensities at various intervals of time after tasting) are described. [See also FSTA (1972) 4 3H376.] MJD

10 J 1559

[Methodology of organoleptic evaluation of peppers.]

Kolesnikov, V. T.; Orlov, N. P.

*Tovarovедение* 6, 14-17 (1973) [Ru]

A 5-point scheme for organoleptic evaluation of peppers is described, based on colour, shape, odour, taste and consistency at 3 different stages of ripeness. The points, ratings of 8 Soviet var. of peppers are given. RBR

10 J 1642

Sensory evaluation of processed Oklawaha and Flordagrand blackberries.

Knapp, F. C.; Cornell, J. A.; Sherman, W. B. *Proceedings of the Florida State Horticultural Society* 83, 328-330 (1972, publ. 1973) [7 ref. En] [IFAS Food Sci. Dept., Gainesville, Florida, USA]

Jellies, jams, and preserves prepared from 'Oklawaha' (Ok) and 'Flordagrand' (Fg) blackberries, were rated at least as acceptable as, and were sometimes preferred over, corresponding commercial products. The 2 cultivars appear to have equally good flavour. Acceptability of Fg pie fillings was independent of fruit level but that of Ok fillings was inversely related to fruit level (55-75%). Removal of seeds from pie fillings had no effect on acceptability. AS

10 U 707

Guide for sensory evaluation of foods. I. Optimum requirements.

India, Indian Standards Institution

*Indian Standard IS:6273 (Part I)-1971* 10pp.

(1972) [En] Price Rs. 3.50 [New Delhi, India]

This standard provides guidelines for sensory evaluation of foods under the headings: personnel; panels; laboratory set-up and equipment; sampling; preparation of samples; and presentation of samples. JA

11 A 516

[Fundamental textural characteristics of gel foods.]

Toda, J.; Wada, T.; Fujisawa, K.

*Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakai-shi]* 47 (2) 95-102 (1973) [14 ref. Ja, en] [Food Res. Lab., Takeda Chem. Ind. Ltd., Osaka]

Studies on gel foods were carried out to find their fundamental textural characteristics. Textural qualities of 11 gel foods were evaluated using 15 descriptive 7-point rating scales and 17 onomatopoeic words. Application of principal component analysis revealed 5 fundamental characteristics with sensory parameters corresponding to each characteristic as follows: (i) hardness and/or chewiness (primary parameter "hard-soft", secondary parameters "brittle/fragile-not brittle/not fragile" and "elastic-not elastic"); (ii) adhesiveness and/or viscosity (primary "sticky-not sticky", secondary "viscous-not viscous"); (iii) wetness (primary "dry-wet"); (iv) oiliness (primary "oily/greasy-not oily-not greasy"); and (v) smoothness (primary "smooth-rough"). [See also FSTA (1971) 3 5A219-221 & 10A446.] AS

11 A 517

[Classification of solid foods on the basis of textural quality.]

Toda, J.; Wada, T.

*Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakai-shi]* 47 (2) 89-94 (1973) [7 ref. Ja, en] [Food Res. Lab., Takeda Chem. Ind. Ltd., Osaka]

Textures of foods, is





In order to establish a systematic subjective method for texture evaluation, it is necessary to know the fundamental characteristics of textural quality. As fundamental textural characteristics seem to differ from food to food, classification of solid foods on the basis of textural quality has been studied prior to studies on fundamental characteristics. Classification and matching procedures were used. Mathematical study of results indicated that solid foods can be classified into 3 categories: gel, sponge and porous. [See also *ESTA* (1971) 3 10A446.] AS

12 A 564

Sweet and bitter tastes of alicyclic and o-heterocyclic glycols.

Hodge, J. E.; Goodwin, J. C.; Warner, K. *Abstracts of Papers, American Chemical Society* 166, AGFD 118 (1973) [En] [N. Regional Res. Lab., USDA, 1815 N. University Street, Peoria, Illinois 61604, USA]

Toward establishing a stereochemical basis for sweet taste, the simplest hydroxylic compounds were investigated in various cyclic configurations and in relatively fixed conformations. The spacing requirements for glycol groups to induce a sweet taste were sought within a group of cis- and trans-1,2-, 1,3-, and 1,4-cycloalkanediols and methyl-cyclohexanediols. Also tested were o-heterocyclics; e.g., erythritan, levoglucosan, and o-substituted methyl glycosides. To gain information about conformations in solution, intramolecular hydrogen bonds were detected by IR measurements in hydrophobic media, and the complexing of cis-glycols with boric acid was detected by AC-conductivity measurements. Intensities of sweetness and bitterness of aqueous solutions were scored by a taste panel. The cis- and trans-1,2-cyclohexanediols do not induce a sweet taste. Both cis- and trans-1,3-cyclohexanediols and the cis-1,4-cyclohexanediol, but not the trans-, are sweet. Levoglucosan, with trans-diaxial (anti-periplanar) pairs of 3 vicinal hydroxyl groups, is definitely sweet. Each glycol was bitter in varying degrees; however, sweet and bitter intensity scores were reproducible by a trained panel. Modifications are needed in that part of the Shallenberger-Acree molecular theory which relates to spatial orientation of glycol groups that induce a sweet taste. AS

12 M 1535

[Texture of bread and bakery products.] *Textur von Brot und Backwaren*. [Review]

Wassermann, L.

*Getreide, Mehl und Brot* 27 (9) 287-292 (1973) [33 ref. De] [Lab. der Firma Ulma Spatz, Vater und Sohn Eiselen, Ulm (Donau), Federal Republic of Germany]





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1

### Effect of some citrus juice constituents on taste thresholds for limonin and naringin bitterness.

Guadagni, D. G.; Maier, V. P.; Turnbaugh, J. G. *Journal of the Science of Food and Agriculture* 24 (10) 1277-1288 (1973) [10 ref. En] [W. Regional Res. Lab., USDA, Berkeley, California 94710, USA]

A panel of 20-27 screened judges was used to determine the threshold of pure limonin and naringin in distilled water, sucrose solutions, citric acid solutions adjusted to various pH values and in citrus juice model systems. Thresholds in distilled water were 1 and 20 mg/l. for limonin and naringin, respectively. Sucrose, citric acid and combinations of these constituents in a model system increased the threshold of limonin and naringin several fold. The highest thresholds were obtained at low pH values in the absence of sugar. In a 1.2% citric acid solution containing 5% sucrose, 2.5% dextrose and 2.5% fructose the max. limonin threshold of 11 mg/kg was obtained at pH 3.8. The max. difference threshold for limonin in orange juice was 6.5 mg/kg and also occurred at pH 3.8. The optimum pH for limonin bitterness suppression (max. threshold) was 3.8 in both model systems and natural orange juice. Thresholds on either side of this value were lower and limonin bitterness was more noticeable. No pH optimum was observed for naringin threshold in model systems. Individual thresholds showed a wide range of sensitivity to both limonin and naringin bitterness. AS

2

### Physical requirements for sensory testing.

Larmond, E.

*Food Technology* 27 (11) 28, 30, 32 (1973) [10 ref. En] [Food Res. Inst., Res. Branch, Agric. Canada, Ottawa]

Sensory evaluation is concerned with human evaluation of physical stimuli. Since people are being used as measuring instruments, every effort must be made to control the effect of the environment on judgment. Factors such as testing environment, sample preparation, method of presentation, etc., that need to be controlled to minimize their influence on judgment, are discussed. IFT

3

### Selection and training of sensory judges.

Martin, S. L.

*Food Technology* 27 (11) 22, 24, 26 (1973) [26 ref. En] [Foremost Foods Co., Res. and Development Center, PO Box 2287, Dublin, California 94566, USA]

4

### The meanings of flavors and textures.

Jellinek, J. S.

*Food Technology* 27 (11) 46, 48, 50-51, 55 (1973) [2 ref. En] [Dragoco GmbH, 345 Holzminden, Federal Republic of Germany]

A study of consumer associations between flavour words and various eating times, eating situations, and people types led to the hypothesis that flavours and textures are sensory signals of the physiological responses required to reduce foods to the state at which they are absorbable into the bloodstream. IFT

5

### [The tetrad test as a suitable sensory method. II. Possibilities for evaluation of test panel members.]

Der Tetraden-Test als aussagefähige sensorische Methode. II. Möglichkeiten zur Beurteilung von sensorischen Prüfpersonen.

Römer, G.; Renner, E.

*Zeitschrift für Lebensmittel-Untersuchung und -Forschung* 152 (4) 219-223 (1973) [19 ref. De, en] [Inst. für Tierzucht & Haustiergenetik, Justus Liebig Univ., Giessen, Federal Republic of Germany]

A method for assessment of the performance of tetrad-test panel members is described. The method is based on the panellists' percentage of correct results, and takes into account differences in the difficulty of individual test series. Results of evaluation of 21 panellists (based on approx. 2500 test results) are briefly discussed, with reference to the individual panellists' taste thresholds for sucrose, NaCl, citric acid and quinine. [See FSTA (1973) 5 8A394 for part I.] AJDW

6

### [The basic elements of the organoleptic analysis of foods. I. Taste.] [Review]

Sadini, V.

*Industria Alimentari* 12 (10) 107-119 (1973) [19 ref. It]

7

### An analytical and integrative approach to sensory evaluation of foods. [Lecture]

Kramer, A.

*Journal of the Science of Food and Agriculture* 24 (11) 1407-1418 (1973) [23 ref. En] [Univ. of Maryland, College Park, USA]

Total sensory evaluation of foods involves  $\geq 4$  senses each of which may include one to many distinct attributes of quality. Thus it is necessary to test for the various significant attributes separately before arriving at a total quality assessment. Sensory evaluation may be performed directly by a taste panel, or indirectly by objective physical-chemical tests which must be validated by





demonstrated high correlation with taste panel responses. For determining differences, panelists should be trained. For consumer preference, untrained panels representative of the target population must be employed. In either case, scalar, variables, rather than attributes data should be utilized for max. efficiency (power). The sample number ratio is presented as a technique for measuring relative efficiency of taste-testing procedures. The contribution of specific attributes to total sensory quality may be calculated by multiple regression analysis where total quality is the dependent variable and specific attributes of quality are independent variables. Independent variables contributing significantly to predictability of total quality are retained in the equation and others are dropped. An example of this procedure, using subjective and objective procedures, is presented.

AS

## 8

[INTERLAB - Seminar 'Dried milk and whey'.]  
Gegenwärtiger Stand der Milchpulveruntersuchung  
INTERLAB-Seminar "Milch- und Molkepulver".  
Klupsch, H. J.

*Deutsche Milchwirtschaft* 24 (39) Beilage  
Lebensmittel-Labor 3, IV-XI (1973) [1 ref. De]  
[Bockum-Hövel, Federal Republic of Germany]

Abstracts are included of the following papers presented at the seminar, held in Kempten (Allgäu) during 22-24 May 1973: Problems of moisture determination in dried milk and dried whey, by H. Mair-Waldburg (pp. V-VI); Effect of the method on results of bacterial count determination, by Lübenau-Nestle (p. VI); Staphylococci in dried milk, by R. Demeter (pp. VI-VII); Anaerobic and aerobic spore-formers, by K. J. Zaadhof (p. VII); Aflatoxins and staphylococcal enterotoxins, by G. Terplan (pp. VII-VIII); Problems in and techniques of sampling, and packaging and dispatch of samples, by F. Voll (p. VIII); Threshold value test and triangle test, by D. Rohse (p. IX); Effect of manufacture on quality criteria and composition of dried whey, by E. Engl (p. IX); Lysine and fructose lysine - quality problems, by H. Erbersdobler (pp. IX-X); and Organoleptic testing of dried milk and dried whey, by F. Beyer (p. XI). FL

## 9

[Experience with sensory analyses.] Über  
Erfahrungen bei der Durchführung sensorischer  
Analysen.  
Manke, A.

*Fleisch* 27 (10) 186-188 (1973) [2 ref. De]  
[Veterinärhygiene-Inspektion im Bezirk Rostock,  
German Democratic Republic]

Sensory evaluation of foods is discussed, with special reference to selection and training of panellists. IN

## 10

Meaning of texture words to the consumer.

Szczesniak, A. S.; Skinner, E. Z.

*Journal of Texture Studies* 4 (3) 378-384 (1973)  
[5 ref. En] [General Foods Corp., Tech. Center,  
White Plains, New York 10625, USA]

A word association test administered to 102 respondents indicated that the consumer understands the qualitative meaning of texture words in the same manner as people experienced in texture evaluation. A few words such as thin, thick, dry, smooth, hard, etc. were found to have additional meanings related to characteristics other than texture. The responses were used to compile a tabulation of foods having specific recognizable textural characteristics. This tabulation should be useful in explaining the meaning of texture words to people unfamiliar with the nomenclature or in situations where a language barrier exists. AS

## 11

[Study of sensory sensibility from the viewpoint of  
duties of public health veterinary inspection.]

Bilska, W.; Wyslouch, W.; Krzyzaniak, K.

*Medycyna Weterynaryjna* 29 (2) 105-108 (1973)  
[7 ref. Pl] [Zaklad Higieny Weterynaryjnej,  
Poznan, Poland]

The sensibility of 77 public health veterinary inspectors to acid, bitter, salty and sweet taste and their ability to discern taste and odour were tested by methods prescribed by Polish Standard PN-65/A-04021. Allspice, caraway, pepper, marjoram and onion, all used in meat processing, served as test substances. The apparatus and procedure are described and illustrated. Sensitivity to bitter taste was least (84.4% correct evaluations) and that to acid taste was greatest (100%); it was approx. equal for salty and sweet taste (94.8 and 93.5% respectively). The taste memory test proved most difficult (difference threshold, 75.3% correct evaluations). It is recommended that veterinarians concerned with public health food inspection be tested for sensory sensibility. SKK

## 12

Concepts in sensory analysis of foods.

Pangborn, R. M.

*SIK Rapport* No. 321, 32pp. (1973) [33 ref. En]  
[Dept. of Food Sci. & Tech., Univ. of California,  
Davis, USA]

Sensory evaluation of foods is discussed, with reference to elimination of misconceptions, definition of objectives, and environmental, psychological and physiological factors influencing sensory perception and evaluation. AJDW





## 13

**Data analysis: sample size in paired taste testing experiments.**

Gacula, M. C., Jr.; Kubala, J. J.

*Canadian Institute of Food Science and Technology Journal* 6 (3) 175-183 (1973) [6 ref. En, fr]  
[Armour Food Co., Food Res. Lab., 801 West 22nd Street, Oak Brook, Illinois 60521, USA]

## 14

**Complex sensory assessment.** [Review]

Harries, J. M.

*Journal of the Science of Food and Agriculture* 24 (12) 1571-1581 (1973) [56 ref. En] [Meat Res. Inst., Langford, Bristol, UK]

Some themes, common to food science, psychology and statistics, are reviewed in the context of practical sensory experimentation with difficult foods, or with simple foods in difficult situations. The recurrence of certain phenomena is noted and some ways are suggested in which a knowledge of statistics and psychometrics can help the food scientist in the future development of sensory methods. AS

## 15

**Derivation of a profile method for sensory analysis of beer flavour.**

Clapperton, J. F.

*Journal of the Institute of Brewing* 79 (6) 495-508 (1973) [28 ref. En] [Brewing Ind. Res. Foundation, Nutfield, Redhill, Surrey, UK]

Flavour assessment ultimately depends on sensory methods of analysis. Profile methods are considered to offer the best current solution to the problem of describing, and as far as possible quantifying, beer flavour. The sensory characteristics of flavour must be identified and described systematically and objectively, without prejudice due to preferences. A flavour 'vocabulary' is needed which is applicable to all types of beer. This involves selection of significant terms which have the same meaning for different people. Any system universally applicable to all type of beer must necessarily be complex, but such a 'universal' system is essential for research. It also provides a 'dictionary' from which terms can be selected for simpler profiles for quality control of particular products. The steps in the development of a profile system are described. Development has depended and will continue to depend on the collaboration of a large number of individuals and groups of people within the industry. Profile systems cannot be static but must continuously evolve. AS

## 16

**[Fundamental textural characteristics of sponge foods.]**

Toda, J.; Wada, T.; Fujisawa, K.

*Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi]* 47 (8) 511-512 (1973) [2 ref. Ja, en] [Food Res. Lab., Takeda Chem. Ind. Ltd., Osaka]

Textural characteristics of sponges were organoleptically evaluated and the following 5 fundamental textural characteristics and the sensory parameters corresponding to them are suggested: (i) hardness and/or chewiness (primary parameter, 'hard-soft', secondary parameter, 'crumbly-not crumbly'); (ii) viscosity (primary, 'viscous-not viscous'); (iii) wetness (primary, 'dry-wet'); (iv) oiliness (primary, 'oily/greasy-not oily/not greasy'); (v) fineness (primary, 'coarse-fine'). [From En summ.] AA

## 17

**[Fundamental textural characteristics of porous rigid foods.]**

Toda, J.; Wada, T.; Fujisawa, K.

*Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi]* 47 (8) 513-514 (1973) [4 ref. Ja, en]

Textural qualities of porous rigid foods such as, biscuits, cookies, crackers, rice crackers etc., were organoleptically evaluated. 5 fundamental textural characteristics and the sensory parameters corresponding to them are suggested. These correspond to those listed in the preceding abstract. [From En summ.] AA

## 18

**[Physiology of olfaction.]** [Review]

Takagi, S.

*Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi]* 68 (5) 346-351 (1973) [4 ref. Ja] [School of Med., Gunma Univ., Maebashi]

Properties, organs, theories and tests of olfaction, and influence of smell on the human body are discussed. YN

## 19

**Subjective-objective evaluation of model odor systems.**

Powers, J. J.; Quinlan, M. C.

*Lebensmittel-Wissenschaft + Technologie* 6 (6) 209-214 (1973) [43 ref. En] [Dept. of Food Sci., Univ. of Georgia, Athens, 30602, USA]

4 mixtures varying in composition were formulated from 8 pure odorous compounds and propylene glycol. The mixtures were then evaluated for odour preference by 10 judges. The 4 mixtures were also analysed by discriminant analysis. There was a good correlation between the sensory scores





and the Z values of the discriminant function. Based upon Z values, 19 out of 20 "unknown" chromatograms were correctly identified as to the odour mixture which they represented. AS

## 20

[The basic elements of organoleptic analysis of foods. II. Odours.]

Sadini, V.

*Industria Alimentari* 12 (12) 66-75 (1973) [15 ref. It, en]

See FSTA (1974) 6 2A65 for part I.

## 21

[German Agricultural Society prizes encourage winemaking.] DLG-Bundesweinprämierung fördert den Weinbau.

Röder, K.

*Der Deutsche Weinbau* 29 (1) 12, 17 (1974) [De]

The wine quality trials conducted in the Federal Republic of Germany by the German Agricultural Society are briefly discussed, with special reference to the objectives of the quality trials and the criteria taken into consideration in evaluating the quality of the wines. AJDW

## 22

Temperature, percent sugar and pH effects on the flavor development and tenderness of pickled eggs.

McCready, S. T.

*Poultry Science* 52 (4) 1310-1317 (1973) [5 ref. En] [Dept. of Poultry Sci., Florida Agric. Expt. Sta., Gainesville, 32601, USA]

Eggs were pickled for 24 h periods at 3 or 24°C, in solutions of varying pH and sugar concn., and at a range of initial temp. of eggs and pickling solutions. Flavour and tenderness were evaluated by taste panellists; shear values were also determined. Flavour scores were highest when initial egg and pickling solution temp. were at least 65°C, and ageing temp. was 24°C. Results indicated that initial pickling solution temp. of 24°C or less and an ageing temp. of 3°C inhibited flavour development. Panellists were unable to differentiate the tenderness of eggs pickled in solutions containing 0-40% sugar; samples pickled in solutions containing 45-60% sugar were rated significantly lower in tenderness. Shear values of pickled eggs were significantly higher than those of non-pickled hard-cooked eggs. Sugar concn. of 25% or higher significantly increased the shear value of pickled eggs. Eggs pickled in solutions containing no sugar had wt. losses of 6.2-9.0%; additional wt. losses occurred as the % sugar increased, and as pH value increased above 5. AS

## 23

A non-parametric ranking method for the statistical evaluation of sensory data.

Kramer, A.; Kahan, G.; Cooper, D.; Papavasiliou, A.

*Chemical Senses and Flavor* 1 (1) 121-133 (1974) [10 ref. En] [Univ. of Maryland, College Park, USA]

Sensory data are rarely normally distributed and should, therefore, be statistically analysed by non-parametric techniques. A computer programme was devised for generating tabular data by which up to 20 samples can be compared following evaluation by as many as 75 panellists. When samples are initially ranked, rank sums for each sample may be compared to appropriate entries in the tables directly. If scalar values are assigned by panellists, the technique is still useful, but the values must first be converted to ranks. AS

## 24

Are there primary tastes for man?

McBurney, D. H.

*Chemical Senses and Flavor* 1 (1) 17-28 (1974) [12 ref. En] [Dept. of Psychology, Univ. of Pittsburgh, Pennsylvania 15260, USA]

11 lines of evidence are adduced in favour of the notion of 4 primary or basic tastes. Recent data from the author's laboratory that bear on some of these points are briefly summarized, including: effect of locus on threshold and suprathreshold magnitude, temp. dependence of thresholds, cross adaption, water tastes, and the temporal properties of the response to different taste substances. AS

## 25

The sensory coding of taste quality. [Lecture]

Pfaffmann, C.

*Chemical Senses and Flavor* 1 (1) 5-8 (1974) [17 ref. En] [Rockefeller Univ., New York, New York 10021, USA]

## 26

Influence of colour on taste thresholds.

Maga, J. A.

*Chemical Senses and Flavor* 1 (1) 115-119 (1974) [8 ref. En] [Dept. of Food Sci. and Nutr., Colorado St. Univ., Fort Collins, 80521, USA]

Increasing molar concn. of sweet, sour, bitter and salty were evaluated in colourless and coloured (red, green, yellow) water solutions by 28 untrained students. Green colour statistically increased sweet taste threshold sensitivity while yellow colour decreased taste sensitivity. Red colour did not affect the taste sensitivity of sweet. In the case of sour, both yellow and green colours decreased sensitivity with red having no effect. Red colour decreased bitter taste sensitivity with yellow and green colour having no effect. No significant differences due to colour affected salty taste sensitivity. Thus, psychological colour association can alter reports of certain basic taste sensations. AS





## 27

Odor quality similarity scaling and odor-word profile matching.

Gregson, R. A. M.; Mitchell, M. J.

*Chemical Senses and Flavor* 1 (1) 95-101 (1974) [18 ref. En] [Univ. of Canterbury, Christchurch, New Zealand]

Multidimensional scalings of odour similarities in 2 conditions were examined, with 7 odours, 15 subjects, and scaling in Euclidean space with individual differences taken out as a third mode, by INDSCAL. It was shown that the presence of additional odour word profiles as dummy stimuli modified the relations between odours, thus attenuating the generality of verbally-based odour scaling methods. AS

## 28

Flavour and taste testing.

Gormley, T. R.

*Food Progress* 2 (4) 2, 4 (1974) [En] [Kinsealy Res. Centre, An Foras Taluntais, Irish Republic]

Although dimensions of taste can be measured objectively (by refractometry or titration, for example), the flavour of a food can be attributable to minute amounts of constituents. Thus, use of a taste panel is essential for organoleptic evaluations. Selection of a taste panel and the paired comparison, triangular comparison, flavour ranking and degree of acceptance panel procedures commonly used are described. PG

## 29

Data analysis: a variable sequential test for selection of sensory panels.

Gacula, M. C., Jr.; Parker, L. A.; Kubala, J. J.; Raume, J.

*Journal of Food Science* 39 (1) 61-63 (1974) [3 ref. En] [Armour Food Res. Lab., 801 W. 22nd St., Oak Brook, Illinois 60521, USA]

An application of Wald's sequential analysis to panel selection is applied to a quantitative response measurement, meat tenderness. In a paired design, the equality  $d_i = A_i - B_i = 0$  [where  $A_i$  and  $B_i$  are scores from paired samples] holds in a pair of identical samples. It is shown that the relationships  $\sum d_i > 0$  and  $\sum d_i < 0$  [where  $\sum d_i$  is the sum of observed measurements of interest] can be represented by regression lines to form boundary lines for selection. The selection of a panelist depends on whether his performance on tests lies inside or outside these boundary lines. A deviation from the expectation  $\sum d_i = 0$  reflects the inability of the candidate to discriminate between samples. Sequential tests involving quantitative response screen candidates for correct identification of sample and magnitude of difference. IFT

## 30

[Sensory perceptions of the beer drinker.]

Hartong, B. D.

*Birra e Malto* 20 (9) 303-307 (1973) [It]

[Oranjeboom Group, Rotterdam, Netherlands]

The auditory, visual, tactile, gustatory and olfactory sensations of the beer drinker are considered. SKK

## 31

Taste threshold values for phenolic acids which can influence flavour properties of certain flours, grains and oilseeds.

Maga, J. A.; Lorenz, K.

*Cereal Science Today* 18 (10) 326-328, 350 (1973) [16 ref. En] [Dept. of Food Sci. & Nutr., Colorado St. Univ., Fort Collins, USA]

Taste thresholds of 30 phenolic compounds were determined and the results tabulated under 3 headings: individual benzoic acid derivatives; individual cinnamic acid derivatives; and miscellaneous phenolic acids. Taste thresholds ranged from the most sensitive flavour compound, m-anisic acid (5) to the least sensitive, syringic acid (240). Phenolic acids reported to be present in flours had taste thresholds in the range 40 to 90 ppm. To evaluate possible synergistic effects of phenolic acid combinations and to relate these more closely to actual phenolic compounds reported in flours, flavour threshold evaluation of phenolic combinations was carried out. Combinations of 2 or more compounds in equally increasing concn. resulted in a more sensitive flavour threshold than did each individual compound. These astringency thresholds, combined with known contents and combinations of phenolic acids in flours, suggest that phenolic acids can contribute significantly to objectionable astringent flavours in flours. VJG

## 32

Factors affecting flavour release and uptake in O/W emulsions. I. Release and uptake models.

McNulty, P. B.; Karel, M.

*Journal of Food Technology* 8 (3) 309-318 (1973) [7 ref. En] [Dept. of Nutr. and Food Sci., Massachusetts Inst. of Tech. Cambridge, 02139, USA]

Flavour release in the mouth was described by a model which assumes that flavour compounds are transferred from oil to water when the interphase concn. stimulates perception. The release equations predict high potential extent of flavour release in the mouth at high values of flavour partition coeff., emulsion dilution, and/or initial emulsion oil fraction. Application of the release model to n-alkanal threshold concn. in oil and water revealed that n-alkanal partition coeff. and threshold concn. in O/W emulsions, (including milk), could be satisfactorily predicted. The release and uptake models are general in nature and may be applied to interphase transport in any liquid dispersed system following dilution with the continuous phase. AS





## 33

**Factors affecting flavour release and uptake in O/W emulsions. II. Stirred cell studies.**

McNulty, P. B.; Karel, M.

*Journal of Food Technology* 8 (3) 319-331 (1973) [23 ref. En]

See preceding abstr.

## 34

**Intensity-time curves for flavored oil-in-water emulsions.**

McNulty, P. B.; Moskowitz, H. R.

*Journal of Food Science* 39 (1) 55-57 (1974) [8 ref. En] [Dept. of Agric. Eng., Univ. Coll., Dublin, Irish Republic]

The taste intensity of anethole was evaluated by a panel of 14 individuals. 5 anethole levels and 3 oil fractions were employed. Panelists dipped their tongue, without stirring, into the emulsions, and judged the taste intensities at intervals of 5 s for a total of 60 s. In all cases perceived intensity increased over time, and the data was fitted by alternate mathematical functions. A large interaction was demonstrated both in vitro and by subjective estimates, between anethole and the hydrophilic surfactant, Tween 60. The interaction greatly reduced the anticipated differences in perceived taste intensities among different anethole levels. IFT

## 35

**Taste adaptation: the case of the wandering zero.**  
O'Mahony, M.

*Journal of Food Technology* 9 (1) 1-12 (1974) [75 ref. En] [Dept. of Psychology, Bristol Univ., 8-10 Berkeley Square, Clifton, UK]

Recent developments in taste psychophysics are reviewed. The zero (level of adaptation) for taste appears to vary with salivary content, which in turn varies with physiological changes and any residual taste stimulus that has recently been placed in the mouth. The effect of the interstimulus procedure, whether mouthrinsing or expectoration, on the amount of residual stimulus is discussed and is important in determining thresholds and intensity measures. The effect of language and criterion on thresholds is also noted. Psychophysical methods of solving these problems are discussed in relation to food tasting. AS

## 36

**Scoring of taste test data on computer cards.**  
Gipps, P. G.

*CSIRO Food Research Quarterly* 33 (1) 15-18 (1973) [2 ref. En] [Div. of Mathematical Statistics, CSIRO, N. Ryde, NSW, Australia]

A description is given of procedures by which tasters record their scores directly on IBM Port-a-punch computer cards. Considerable savings in time and labour can be made in the period between completing a tasting experiment and obtaining the

analysed results, since checking, tabulation and analysis can be carried out by computer with the min. of manual involvement. VJG

## 37

**Taste panel techniques. I. Reproducibility, reliability and validity.**

Howard, A.

*CSIRO Food Research Quarterly* 32 (4) 80-84 (1972) [6 ref. En] [Div. of Food Res., CSIRO, Cannon Hill, Queensland 4170, Australia]

The importance of reproducibility, reliability and validity for both consumer preference and analytical panels is first stressed. Methods of remedying the lack of reproducibility and reliability are considered and a method of direct ratio estimation is suggested as a possible technique for producing valid scoring of the magnitudes of subjective properties. [See following abstr. for Part II.] VJG

## 38

**Taste panel techniques. II. A validating technique.**  
Howard, A.

*CSIRO Food Research Quarterly* 33 (1) 8-14 (1973) [2 ref. En]

A description is given of the way in which scales produced by direct ratio estimation can be validated. An illustration is given results for various properties that might be expected to give scores of varying validity, e.g. estimation of the length of metal rods. Tests were then applied to the estimation of intensity of flavour of solutions of sugar, salt and meat extract, estimation of difference in flavour and a comparison of interval and ratio scales. [See preceding abstr. for Part I.] VJG

## 39

**Taste testing.**

Canales, A. M.; Cantu, R. G.

*Technical Quarterly, Master Brewers Association of America* 11 (1) 17-20 (1974) [25 ref. En, es] [Cerveceria Cuahatemoc SA, Monterey, Mexico]

A procedure for the selection of judges for the flavour testing of beer is described and discussed. It is suggested that the sensitivity of potential judges should be carefully examined by subjecting them to organoleptic tests of nearly 30 components and evaluating the results statistically. AA

## 40

**Methods of sensory evaluation of quality and application of statistical methods in sensory evaluation problems with special reference to fishery products.**

Iyer, H. K.

*Fishery Technology* 9 (2) 104-108 (1972) [13 ref. En] [Central Inst. of Fisheries Tech., Ernakulam,





Cochin-11, India]

This review-type article first discusses the usefulness of sensory evaluation in assessing the quality of raw and processed fishery products, then outlines methods used in sensory evaluation (in general, difference, preference, descriptive and sensitivity tests; and specifically, single sample, paired comparison, duotrio, dual standard, multiple comparison, triangle, rank order and scalar scoring tests), and statistical methods use in sensory evaluation problems (binomial distribution, 't' distribution, analysis of variance, sequential analysis, fractional replication, technique of confounding, incomplete block designs, chi-square). The article also details a primary taste test for screening potential taste panel members for their sensitivity to basic tastes (saltiness, acidity, sweetness, alkalinity, bitterness), reviews previous work on selection of a taste panel for frozen and canned sea-food [see FSTA (1974) 6 3R175], and describes the use of a descriptive numerical scoring system for fish. JA

#### 41

**Profile analysis and flavour discrimination.**

Clapperton, J. F.

*Journal of the Institute of Brewing* 80 (2) 164-173 (1974) [17 ref. En] [Brewing Ind. Res.

Foundation, Nutfield, Redhill, Surrey, UK]

The relative merits of profile tasting and difference tasting are discussed. Profile analysis can reveal and characterize flavour differences that are not revealed by difference tasting using the triangular or 3-glass test, even though the same people carry out both types of test. A multiple comparison test is used in conjunction with profile analysis to reveal the size as well as the nature of perceived differences in flavour. This is exemplified by studies of the effect of adding increasing amounts of diacetyl to 3 different types of beer. It may be necessary to consider not just the presence of individual flavour notes, but also their duration and order of perception in order to explain the effects of flavour potentiators, such as guanosine 5'-monophosphoric acid. AS

#### 42

**Analysis of taste test data by multivariate methods.**

Best, D. J.

*Food Technology in Australia* 26 (1) 20-22 (1974)

[8 ref. En] [CSIRO Div. of Mathematical Statistics, Div. of Food Res., North Ryde, NSW, 2113]

Differences in individual qualities between samples as assessed in taste tests have hitherto been tested by separate analyses of variance. An overall conclusion is then made by compounding the separate qualities by multivariate analysis of variance (MANOVA). The article illustrates the application of MANOVA to 3 types of sultanas and shows that when an electronic computer is available it is a powerful method of integrating results. For

the purposes of comparison of methods the data have also been analysed by the univariate ANOVA method. Variations between judges are ignored. PG

#### 43

**Food chemistry from a food technologist's viewpoint.**

Wrolstad, R. E.

*Food Technology in New Zealand* 8 (8) 16-17, 20, 32 (1973) [8 ref. En] [Oregon St. Univ., Corvallis, USA]

Aspects covered include: the empirical nature of food chemistry; qualities of concern to food technologists (colour, flavour and texture); nutritional value; food analysis; and the future of the food chemist. VJG

#### 44

**[Recent findings relating to the taste of sweetness.]**

[Review]

Heraud, G.

*Cahiers de Nutrition et de Dietetique* 9 (1) 33-37 (1974) [8 ref. Fr]

#### 45

**A comprehensive formula for the acceptance of food texture, and its generalization to overall food acceptance.**

Drake, B.

*Journal of Texture Studies* 5 (1) 109-113 (1974)

[En] [Swedish Inst. for Food Preservation Res.

(SIK), Fack, S-400 21, Göteborg 16, Sweden]

A survey is made of factors contributing to food texture (atoms, molecules, structure, mechanics) together with factors leading to food texture acceptance (stimulus-response, preferences), and a formula is developed for the relations among all these factors. An extension to general acceptance, involving all sensory quality factors, is also made. AS

#### 46

**[The correlation between organoleptic and gas chromatographic data.]** Beitrag zur Korrelation sensorischer und gas-chromatographischer Daten. Schrödter, R.; Rödel, W.; Erhardt, V.; Freimuth, U.

*Nahrung* 18 (2) 171-172 (1974) [8 ref. De]

[Zentralinst. für Ernährung, Potsdam-Rehbrücke, German Democratic Republic]

Brief details are given of a study on the correlation of organoleptic properties (taste and smell) with the results of GLC analysis (by a head-space method or an aroma concentration method) of 26 samples of apple juice from the 1970 apple crop. Data were evaluated by regression analysis





and determination of simple and multiple correlation coeff. The high correlation coeff. obtained (approx. 70%) confirm the suitability of GLC for objective evaluation of the quality of apple juice. IN

## 47

**Flavor characteristics of conventional and fabricated potato chips.**

Kintner, J. A. B.

*Dissertation Abstracts International*, B 34 (7) 3291: Order no. 74-609 (1974) [En] [Univ. of Nebraska, Lincoln, USA]

A GLC separation procedure and organoleptic tests were used for comparing flavour differences between (i) fabricated and (ii) freshly fried conventional chips. In general, differences exhibited by chromatograms were due to losses of flavouring materials found in (ii), and by restoring relative concn. of some flavour compounds it was possible to approximate the traditional flavour in (i). The groups of compounds, primarily carbonyl and pyrazine- compounds, which were found to be successful in producing a chromatograph more like (ii) and a favourable taste panel reaction are given. AL

## 48

**Preparation and storage properties of drum dried white yam (*Dioscorea rotundata* Poir) flakes.**

Onayemi, O.; Potter, N. N.

*Journal of Food Science* 39 (3) 559-562 (1974) [32 ref. En] [Dept. of Food Sci., Cornell Univ., Ithaca, New York 14850, USA]

The white yam *Dioscorea rotundata* Poir was characterized, drum dried to different moisture levels, and stored at temp. of 21.1°C, 29.4°C and 37.8°C for 90 days. Fresh and stored samples were analysed for changes in colour, ascorbic acid and organoleptic qualities. Freshly dried and reconstituted yam flakes were judged highly acceptable compared to conventionally mashed fresh yam and retained acceptability through storage. The taste panel consisted of persons from several West African countries. Changes in the flakes during storage are described. IFT

## 49

**Evaluation of spaghetti quality by a laboratory panel.**

Larmond, E.; Voisey, P. W.

*Canadian Institute of Food Science and Technology Journal* 6 (4) 209-211 (1973) [6 ref. En] [Food Res. Inst., Eng. Res. Branch, Agric. Canada, Ottawa, Ontario K1A 0C6]

The quality of spaghetti was evaluated by a trained laboratory panel. Rating scales were constructed for characteristics which the panel found important. 8 varieties of spaghetti were rated

for firmness, chewiness, adhesiveness, starchiness and flavour. The results of these rating were compared with results of acceptance tests by a consumer panel. The consumers preferred spaghetti which received low scores for gumminess, adhesiveness and starchiness and higher scores for firmness, chewiness and individuality. Flavour contributes little in predicting consumer reaction. Firmness and gumminess as rated by the laboratory panel were sufficient to predict consumer acceptability. AS

## 50

**Comparison of salami sausage produced with and without addition of sodium nitrite and sodium nitrate.**

Skjelkvale, R.; Tjaberg, T. B.; Valland, M.

*Journal of Food Science* 39 (3) 520-524 (1974) [11 ref. En] [Norwegian Food Res. Inst., Box 50, 1432 As-NLH, Norway]

Pilot plant production of salami dry sausage with and without addition of nitrite was carried out. Microbiological, rheological and organoleptic properties of products were investigated during fermentation and after storing products at 20°C for 3 months. Results of microbiological investigation

indicate that fermentation and ripening of sausage would take a normal course without addition of nitrite, glucono-delta-lactone (GDL) or starter culture. In a triangle test performed at the end of the ripening period, the taste panel was unable to distinguish between products with and without nitrite. After 3 months' storage a significant difference was found between products with and without addition of nitrite, and nitrite-cured products were given the best score. In series in which GDL or starter culture was added, no significant differences in organoleptic quality were found even after storage for 3 months. IFT

## 51

**Replicated composite complete-incomplete block designs for sensory experiments.**

Cornell, J. A.; Knapp, F. W.

*Journal of Food Science* 39 (3) 503-507 (1974) [4 ref. En] [Dept. of Statistics, Univ. of Florida, Gainesville, 32601, USA]

Composite complete-incomplete (C-I) block designs are formed by combining complete blocks of size  $t$  units with balanced incomplete blocks of  $k$  units ( $1 \leq k < t$ ) resulting in blocks of size  $t + k$  units. In sensory experiments, composite C-I block designs have been shown to be more efficient than standard complete block designs. Replication of the blocks in these C-I block designs permits accurate interpretation of panelist  $\times$  treatment interaction effects. Also, formulae for calculating estimates of treatments, panelists, and interaction effects are simpler in form with replicated C-I designs than corresponding formulae with unreplicated C-I block



designs. Analysis of an experiment involving rating of flavour of 3 strawberry preserves using a replicated C-1 block design is presented. [See also FSTA (1973) 5 4A231.] IFT

## 52

**Extrusion processing of triticale.**

Lorenz, K.; Welsh, J.; Normann, R.; Beetner, G.; Frey, A.

*Journal of Food Science* 39 (3) 572-576 (1974) [21 ref. En] [Colorado St. Univ., Fort Collins, 80521, USA]

Whole triticale kernels were extruded using a Brabender Plasticorder extruder with 3/4-in rifled barrel and 1:1 flight depth ratio screw. Samples were extruded at initial moisture contents of 15% and 20% using barrel temp. of 350°F, 400°F and 450°F through nozzle openings of 1/8 in and 1/16 in. The products were measured for pH, final moisture content, colour, trypsin hydrolysis, torque during extrusion, and texture and flavour as evaluated by a taste panel. From the results it was concluded that an acceptable product could be produced at 20% initial moisture using either the small nozzle and operating at 350°F or the larger nozzle and operating at 400°F. IFT

## 53

**[Comparative studies on physical methods for determination of the consistency of bread.]**

Vergleichende Beurteilung physikalischer Verfahren zum Messen der Krumenkonsistenz. Thomas, B.; Juretko, A.

*Veröffentlichung, Arbeitsgemeinschaft*

*Getreideforschung eV* No. 150, 29-44 (1973) [23 ref. De]

See FSTA (1974) 6 1M133.

## 54

**Frankfurters made from mechanically deboned poultry meat (MDPM). I. Effect of chopping time.**

Baker, R. C.; Darfler, J. M.; Angel, S.

*Poultry Science* 53 (1) 156-161 (1974) [4 ref. En] [Coll. of Agric. & Life Sci., Cornell Univ., Ithaca, New York 14850, USA]

In order to evaluate the effect of chopping time independently from end temp. on frankfurters made from mechanically-deboned poultry meat (MDPM), chopping times ranging from 1.5 to 15 min. were achieved by adjusting the starting temp. of the material. MDPM from backs and necks of fryers deboned by 3 different machines was evaluated. An end temp. of 12°C was used in all the trials. Shear values, heating loss, cooked stability, emulsion viscosity, visual observations and taste panel scores were used for evaluation of the samples. Chopping time had little effect on results of the objective tests or the taste panel evaluation,

stability, shear value and organoleptic test results showed differences in the quality of frankfurters made with the 3 machines.

AS

## 55

**[Freeze drying of infant foods. II. Storage stability of freeze-dried foods.]**

Flores, J.; Pinaga, F.; Primo, E.; Miro, E.

*Revista de Agroquímica y Tecnología de Alimentos* 14 (2) 296-306 (1974) [31 ref. Es, de, en, fr]

[Inst. de Agroquímica y Tecnología de Alimentos, Valencia, Spain]

The stability of freeze-dried infant foods during 3 months storage at 37°C was studied. In vegetable, meat and fish products with 4.5% moisture content, the peroxide index (PI) rose to 2-3 times the level reached with 1% moisture content (e.g. PI of vacuum-packed fish with 1% moisture was 19.0 after 90 days, vs. 62.2 with 4.5% moisture). For the same residual moisture, N<sub>2</sub> packing protected foods against rancidity better than vacuum packing. Most of the deterioration occurred after >30 days storage. In foods with 1% moisture, losses of thiamin, ascorbic acid and available lysine were ≤15% after 3 months at 37°C, with most of the deterioration taking place after >60 days storage. Addition of 3% egg yolk (fresh wt. basis) or 0.3% lecithin reduced the rate of peroxide formation 2-4 times. A tasting panel observed no sign of rancidity in 3 months-old samples with added egg yolk. Processing losses are given in part I [see *Revista de Agroquímica y Tecnología de Alimentos* (1973) 13 (4) 596-608 and FSTA (1974) 6 4G224]. RM

## 56

**Report on S.E. Branch Autumn Joint Meeting.**

Rolfe, E. J. (United Kingdom, Institute of Food Science & Technology, South Eastern Branch; United Kingdom, University of Reading, Food Science Society; United Kingdom, National College of Food Technology, Food Technology Society) (Chairman)

*IFST Proceedings* 6 (4) 221-222 (1973) [En] [Nat. Coll. of Food Tech., Weybridge, Surrey, UK]

Summaries are given of the following 3 papers which were presented at this meeting held at the National College of Food Technology, Weybridge on 25 Oct. 1973: Recent advances in instrumental methods of assessing food flavour, by B. K. Howe (p. 221); Recent advances in sensory methods of assessing food flavours, by R. Harper (p. 221); and Recent advances in methods of assessing food texture, by A. Williams (p. 222). JA

## 57

**[Sensorische Evaluation.]** Über sensorische





Poland]

Methodological problems of sensory testing of food quality are discussed, with reference to: subdivision of test methods (preference methods and objective methods); test requirements; sources of error; aims of the tests; sampling; preparation of samples; sensory reference standards; quality scales; overall quality; critical limit values; and weighting of parameters. RM

## 58

### [Advances in sensory quality evaluation.]

Fortschritte in der sensorischen Gütebewertung.  
Tilgner, D. J.

*Gordian* 74 (7/8) 238, 240, 242 (1974) [23 ref.  
De, en] [Sopot, Poland]

The development of accurate, reproducible methods of sensory food analysis is discussed with reference to methodology, development of reference standards, correlation with instrumental analysis and threshold values. [See also *Fleischwirtschaft* (1974) 54 (8) 1333.] RM

## 59

### [Sensory evaluation of the organoleptic properties of foods.]

Depledt, F.

*Bulletin Technique d'Information* No. 287, 123-129 (1974) [24 ref. Fr] [Inst. Sci. d'Hygiene Alimentaire, 16 Rue de l'Estrapade, 75005 Paris, France]

## 60

### Personality and sensory acuity.

Harries, J. M.

*Memorandum, Meat Research Institute* No. 23, 10pp. (1973) [11 ref. En] [Meat Res. Inst., Langford, Bristol, BS18 7DY, UK]

The introversion-extroversion scores of 30 regular members of taste panels at the Meat Research Institute were assessed by means of a questionnaire; these scores were then compared with available data for each persons performance in basic taste discrimination tests (using sucrose, quinine sulphate, NaCl and citric acid) and in studies on the flavour, texture and juiciness of meat. The results suggest that discrimination of bitterness and texture increases with increasing introversion, that discrimination of juiciness increases with increasing extroversion, and that discrimination of flavour sweetness, saltiness and sourness are unrelated to the introversion-





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8	Acidulants in Foods	33	Browning of Foods
9	Agglomeration of Powders	34	Aflatoxins
10	Aseptic Packaging	35	Antibiotic Properties and Residues in Food (Excl Nisin)
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TASTE PANELS IN FOOD SCIENCE

SELECTED FROM VOLUME 7  
FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

under the direction of

Commonwealth Agricultural Bureaux, Farnham Royal, Bucks; Institut für Dokumentationswesen,  
Frankfurt am Main; Institute of Food Technologists, Chicago; Centrum voor Landbouwpublikaties  
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TASTE PANELS IN FOOD SCIENCE

VOLUME 7

FOOD ANNOTATED BIBLIOGRAPHY No. 15

*ifis*

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## INTRODUCTION

Food Annotated Bibliographies (FABs) are collections of abstracts on specific topics in food science and technology. The topics are chosen by the staff of the International Food Information Service as being of particular interest or importance. The topics normally interest individual workers, who may not require the full information provided in Food Science and Technology Abstracts, from which the abstracts for FABs are taken. The size and the cost of the FABs are controlled as much as possible with the interests of individual workers in mind.

Titles of the FABs now available are given on the back cover of this booklet. New titles are being added at the rate of about 10 per year. For up-to-date lists of FABs or suggestions for new topics please write to the address given overleaf. New subjects are searched for at least the five most recent volumes of Food Science and Technology Abstracts. Thereafter each FAB is updated monthly. Copies of each month's abstracts on any topic may be obtained as indicated on the back cover of this publication. At the end of each volume of up-dating, the abstracts are merged and made available as a separate supplement to the original FAB.

Some of the larger FABs have been divided into sections to facilitate use. Abstracts are not printed in more than one section. The larger FABs also have subject indexes provided.

Copies of all original articles referred to in the abstracts may be bought (or occasionally borrowed) from the International Food Information Service. A form for ordering these is provided at the end of this FAB.

Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES

ASSISTANT EDITOR





1

### Detection & estimation of styrene monomer in foods packaged in polystyrene containers.

Davies, J. T.; Dunn, J. W.

*IFST Proceedings* 6 (2) 84-85 (1973) [2 ref. En] [R&D Dept., Metal Box Co. Ltd., Twyford Abbey Road, London NW 10, UK]

If a food is stored in contact with polystyrene some styrene monomer will diffuse into the food and, after a certain time, an equilibrium will be approached between the concentration of the monomer in the food and in the polystyrene. There is also a threshold concentration of styrene when an off-flavour will be detected in the food by a taste panel. As a preliminary to assessing the parameters of diffusion curves relating to various polymers in contact with various foods and to assessing the threshold level for each food, the preparation of several foods for styrene determination by GLC is outlined. The foods were water, simple aqueous food (e.g. orange squash), single and double cream, plain yoghurt, chocolate spread and synthetic fat (sunflower oil + soft margarine). Most methods involved extraction with heptane. The taste panel method to determine the threshold of styrene monomer in the various foods involved tasting untreated food and a series of samples in which the styrene concentration increased by a factor of 2 each time. Each sample was marked on a 0-5 hedonic scale. JA

2

### The use of sensory and instrumental assessment of organoleptic characteristics via multivariate statistical methods.

Levitt, D. J.

*Journal of Texture Studies* 5 (2) 183-200 (1974) [16 ref. En] [Statistics Section, Unilever Res. Lab., Colworth House, Sharnbrook, Bedford, UK]

The need to select relevant sensory and instrumental variables is discussed and illustrated by an example concerned with the textural characteristics of a gel system. Discriminant analysis is used to identify the important sensory and instrumental variables and multiple regression to verify that the instrumental variables contain the required information. The limitations of this approach and possible modifications to deal with particular problems are also discussed. The approach described has proved successful in a number of applications. AS

3

### [Texture of bavarois containing low-methoxyl pectin.]

Kawabata, A.; Sawayama, S.

*Journal of the Japanese Society of Food and Nutrition [Eiyo to Shokuryo]* 27 (2) 55-63 (1974) [14 ref. Ja, en] [Dept. of Nutr., Tokyo Univ. of

Agric., Setagaya-ku, Japan]

The texture of and hedonic preference for 2 bavarois made using low-methoxyl pectin and gelatin were examined by instrumental methods and sensory evaluation. Preferred concn. in the basic jelly of bavarois were 1% low-methoxyl pectin, and 2.0 and 2.5% gelatin. Low-methoxyl pectin jelly was preferred by the young and the gelatin jelly by older people. Low-methoxyl pectin bavarois had lower hardness and higher adhesion values than gelatin bavarois; bavarois containing egg white was softer than one containing egg yolk and the adhesiveness of the former was a little larger than that of the latter. However, there was no significant difference in the overall acceptance as assessed by hedonic preference on a 7-point scale. Significant correlations were recognized between some parameters (sweetness, hardness, mouth-feel, elasticity, cohesiveness and adhesiveness) and overall acceptance. It was established that the overall acceptance was greatly influenced by cohesiveness. [From En summ.] JA

4

### [Relation of the taste pattern of green tea with its palatability.]

Nakagawa, M.; Tamura, S.; Ishima, N.

*Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakkai-shi]* 19 (10) 475-480 (1972) [3 ref. Ja, en] [Nat. Res. Inst. of Tea, Kanaya, Shizuoka, Japan]

Sensory tests were made on 20 Japanese and foreign green teas. 18 g green tea were put in a vessel, 1080 ml hot water added and the infusion taken into a flask after 4 min. It was subjected to sensory evaluation at about 40°C after standing for about 2 h. Taste: bitter, astringent, savoury (monosodium glutamate-like), sweet, sour, salty, and strong, and palatability were evaluated for the normal infusion, and at concn. of  $\frac{1}{3}$ ,  $\frac{1}{2}$ ,  $\frac{2}{3}$ , 2, and  $\frac{9}{4}$  of normal, and with added theanine, sucrose, carboxymethyl cellulose, epigallocatechin, caffeine, arginine, epigallocatechin gallate, and monosodium glutamate. Too high and too low bitterness and astringency were inferior to medium values. Taste improved with an increase in savoury taste and sweetness up to a certain level, above which the savoury taste reduced the palatability. SKA

5

### [The relation between soluble solids and flavour scores in apples.]

Landfald, R.

*Meldinger fra Norges Landbrukshogskole* 51 (18) 8pp. (1972) [8 ref. No, en] [Inst. for Fruktdyrking, Norges Landbrukshogskole, As, Norway]

The relationship between soluble solids content after harvest and flavour during storage were investigated in Norway using 260 samples of (i) Gravenstein apples (1961-1970) stored at 4°C and 41 samples of (ii) Filippa (1961-1963) stored at 0



and 2°C. Flavour was evaluated by sensory panel on a scale of 1 (very poor) to 10 (excellent) in Nov., Dec. and Jan. for (i) and Feb. for (ii). Correlation coeff. between soluble solids in Oct. and flavour scores were positive for all yr for (i) and statistically significant in 7 out of 10 yr ( $P < 0.01$ ). Correlation between fruit firmness in Oct. and flavour scores and between acidity in Oct. and flavour scores was in most yr insignificant. In yr with insignificant correlations between soluble solids in Oct. and flavour scores correction for the effect of firmness or acidity led to statistically significant coeff. If Jan. instead of Oct. soluble solids determinations were taken, correlation with flavour score was statistically significant for all yr. With (ii) correlation between soluble solids in Oct. and flavour scores in Feb. was significant for all yr. VJG

## 6

[Consumer opinions on processed sweet cherries.] Süßkirschen-Konserven im Urteil des Verbrauchers.

Liebster, G.; Schmid, P.; Daneschwar, M.

*Industrielle Obst- und Gemüseverwertung* 59 (8) 213-217 (1974) [De] [Inst. für Obstbau der Tech. Univ. München, Weihenstephan, Munich, Federal Republic of Germany]

The results of a questionnaire presented to visitors at 2 different exhibitions in Federal Germany on consumer preferences for processed cherries are presented. The questionnaire covered preferences for type of processing (canning, deep-freezing, natural), type of pack (bottle, can), organoleptic evaluation, colour and sweetness, purchasing frequency, relative position vis-a-vis other fruits, and reason for purchase. Numerous samples were offered to the questionee. The results are given in tabular and graph form. No differences attributable to sex of questionee were found; the major factor influencing choice of sample offered was visual impression. HBr

## 7

Objective method for evaluation of texture of dehydrated mashed potatoes using sensory evaluation as a guideline.

Ooraikul, B.

*American Potato Journal* 51 (4) 105-114 (1974) [13 ref. En] [Dept. of Food Sci., Univ. of Alberta, Edmonton, Canada]

The study was designed to determine the textural characteristic that correlates most strongly with the overall textural quality of mashed potato products. 4 reconstituted dehydrated mashed potato products (granules and flakes) were subjected to sensory evaluation (firmness, smoothness and glueyness) and objective evaluation (firmness, glueyness and bulk density). Glueyness of the mashed potatoes, as judged by the 9 panelists, correlated most strongly with glueyness measured by a texturometer. Firmness evaluated by either method did not

correlate well with overall textural quality of the products. Density correlated quite strongly with objective firmness, objective glueyness and overall textural quality scores. The method and equipment used to measure glueyness appears to be adequate for quality control and/or product development purposes in the dehydrated mashed potato industry. VJG

## 8

Structural functions of taste in the sugar series: sensory properties of deoxy sugars.

Birch, G. G.; Lee, C. K.

*Journal of Food Science* 39 (5) 947-949 (1974) [16 ref. En] [Nat. Coll. of Food Tech., Weybridge, Surrey, UK]

A number of mono- and dideoxy derivatives of the analogous and conformationally stable and well-defined models,  $\alpha, \alpha$ -trehalose and methyl  $\alpha$ -D-glucopyranoside, were tested. Their sensory properties are described and compared with those of some previously known monodeoxy sugars. [See also FSTA (1974) 6 5L275.] IFT

## 9

[Cooking method and evaluation of the cooking quality of pasta products.] Über das Kochen und die Bewertung des Garezustandes von Teigwaren. Menger, A.

*Getreide, Mehl und Brot* 28 (9) 236-241 (1974) [11 ref. De] [Bundesforschungsanstalt für Getreideverarbeitung, Detmold, Federal Republic of Germany]

Evaluation of the cooking quality of pasta products is discussed, with reference to: changes occurring during cooking (absorption of water, denaturation of proteins, swelling of starch); problems of organoleptic evaluation of the quality of pasta products (with reference to a 5-point scale method for classification of the colour, shape, surface consistency, texture, elasticity, flavour and aroma of cooked pasta); and the basic principles and accuracy of 3 instruments for evaluation of the consistency of cooked pasta (the penetrometer, the consistometer and an electronic stress and pressure testing device.) AJDW

## 10

[Testing of milk and milk products.]

Filip, Z.

*Prumysl Potravin* 25 (8) 249 (1974) [Cs]

The author reviews briefly the contents of the revised Czechoslovak standard CSN 57 0530 on methods for testing milk and liquid milk products, with particular reference to sampling, organoleptic testing of packaged products, and testing for chemical composition. A list of a further 17 Czechoslovak standards on densitometers, butyrometers, pipettes, test methods for dairy products, etc. is included. FL



## 11

**Quality and acceptability of brine pickled duck eggs.**

Trongpanich, K.; Dawson, L. E.

*Poultry Science* 53 (3) 1129-1133 (1974) [5 ref. En] [Dept. of Food Sci. & Human Nutr., St. Univ., East Lansing, Michigan 48824, USA]

Cooked and draw duck eggs were held in saturated salt brine for periods up to 4 wk. Fresh egg controls and brine pickled eggs were evaluated for flavour, texture and colour by a panel consisting of about equal numbers of American and Thai ethnic origin. Albumen quality, microbial growth and pH were determined. American panel members preferred flavour, texture and colour of control eggs and rejected or disliked flavour, texture and colour of salt brined eggs. Thai panel members preferred flavour, texture and colour of all salt brined eggs, especially those held in brine for 4 wk at 21°C. Halophilic bacteria were enumerated in eggs after 4 wk in salt brine, followed by 4 wk at 3°C out of brine. No halophilic organisms were detected in control eggs. Counts in uncooked eggs were lower than in those eggs cooked before brine immersion. After 4 wk out of brine, counts in raw eggs reached  $6.0 \times 10^3$ , whereas those cooked before brine treatment reached  $1.7 \times 10^5$ . AS

## 12

**[Sensory methods for evaluation of the quality of fish products.]**

Kizevetter, I. V.

*Rybnoe Khozyaistvo* No. 1, 51-54 (1974) [Ru]

Organoleptic evaluation of the quality of fish and fish products is discussed, with reference to equipment required, correlation of the results of organoleptic tests and chemical analyses, and mathematical processing of the results. As an example, organoleptic evaluation of hot-smoked fish is described. STI

## 13

**The flavor of canned meat. Influence of processing conditions and storage.**

Persson, T.; Sydow, E. von

*Abstracts of Papers, American Chemical Society* 168, AGFD 5 (1974) [En] [Swedish Inst. for Food Preservation Res. (SIK), Fack, S-400 21 Gothenburg, Sweden]

Influence of processing conditions on chemical and sensory flavour properties of canned beef samples of various formulations was studied, e.g. HTST sterilization, aseptic canning, sterilization in various packaging materials including flexible pouches. Storage changes were also studied. Volatile compounds were analysed by a gas chromatographic technique in which headspace sampling permitted analysis of large volumes. Compounds were identified by MS. About 100 compounds were identified, e.g. 21 S compounds,

12 aldehydes and 16 ketones. For sensory evaluation a panel was trained to recognize and assess intensities of various odours. It was concluded that off-flavour in canned beef could be related to certain aldehydes, especially 2-methyl propanol, 2- and 3-methyl butanol, and S compounds, especially H<sub>2</sub>S, methyl mercaptan and dimethyl sulphide. It was shown, for instance, that products sterilized in flexible pouches at 131°C gave a product with improved flavour properties compared to those sterilized at 115°C to the same F<sub>0</sub>-value (= 10). The concn. of off-flavour compounds decreased markedly when the temp. was increased from 115 to 131°C. AS

## 14

**[Technique of sensory tests of meat products.]**

Balogh, F.; Bende, E.; Szabo, A.

*Husipar* 23 (4) 164-168 (1974) [10 ref. Hu, ru, en, de] [Megyei Elelmiszerellenorzo es Vegyvizsgalo Intezet, Győr, Hungary]

Details are given of sensory tests conducted on samples of large Bologna and 'Italian' sausages, manufactured at 3 different meat processing plants in Hungary. Tables of volumes are given for the point scores for shape, colour, odour, taste, consistency and quality of raw materials. All products clearly exceeded the min. point scores specified in Hungarian standards. IF

## 15

**Sensory methods of flavour analysis.**

Land, D. G.

*Tropical Products Institute Conference Papers* pp. 129-135 (1973) [12 ref. En, fr] [Food Res. Inst., Agric. Res. Council, Colney Lane, Norwich, NOR 70F, UK]

This paper which was presented at the Tropical Products Institute Conference on Spices, held at the London School of Pharmacy, on 10-14 April, 1972, discusses the principles and limitations of sensory testing and practical implications in terms of applications of accepted test methods, relevance and reproducibility of results. Characterization of flavour differences between carrots grown at different centres and tests on unprocessed bilberry juice and mixtures in deodorized juice were used to illustrate the methods. RM

## 16

**[Relationship between astringency and the reaction of astringents with proteins.]**

Nakagawa, M.

*Journal of Food Science and Technology [Nihon Shokuhin Kogyo Gakkai-shi]* 19 (11) 531-537 (1972) [8 ref. Ja, en] [Nat. Res. Inst. of Tea, Kanaya, Shizuoka, Japan]

Of 4 groups of astringents (tannins, multivalent metallic salts, halogen-substituted acetic acids, and dehydrating solvents) the last group, e.g. ethyl

alcohol and acetone, gave no astringent taste, but a burning taste at 4.0% (threshold value) and above. Threshold value was 0.038% with *Diospyros kaki* tannin; 0.075% with tannic acid, epicatechin gallate, and epigallocatechin gallate (epigallocatechin and epicatechin gave a bitter taste at 0.075%); 0.038% with  $\text{AlCl}_3$ ,  $\text{Al}(\text{NO}_3)_3$ , and  $\text{CrCl}_2$ ; 0.075% with  $\text{ZnSO}_4$ ; and 0.075% with monochloroacetic and trichloroacetic acids. Bitter, sweet, or acid tastes were often mixed with the astringent taste. Tannins of high mol. wt. formed a complex with water-soluble proteins more easily than low mol. wt. tannins. Al, Zn, and Cr salts formed soluble complexes at low concn. It is concluded that in green tea in which catechin gallate gives bitter and astringent tastes, the degree of formation of complexes with protein might be a useful indicator of the astringent taste. SKA

## 17

### Sensory evaluation by magnitude estimation.

Moskowitz, H. R.

*Food Technology* 28 (11) 16, 18, 20-21 (1974) [2 ref. En] [Food Sci. Lab., US Army Natick Lab., Massachusetts 01760, USA]

The aim of magnitude estimation is to assign numbers to stimuli (taste compounds, odorants, texturizing agents) so that the ratios of judgements reflect sensory ratios. This article discusses the method and provides 3 examples of applications: functions relating subjective magnitudes to objective measurements; trade-offs between different ingredients to achieve equal perceived intensities (e.g. substitution of one sugar for an equally sweet one); and optimization of product parameters by instructing panellists to judge both the sensory level of a product parameter and the desired sensory level. IFT

## 18

### Computer handling of taste panel data.

Warner, K.; Ernst, J. O.; Boundy, B. K.; Evans, C. D.

*Food Technology* 28 (11) 42, 44-45, 47 (1974) [4 ref. En] [N. Regional Res. Lab., USDA, Peoria, Illinois 61604, USA]

This article describes a system for computer handling of taste panel data designed to replace manual transfer and calculation of results. Score sheets were modified to permit easy keypunching of data on computer cards. The main programme was written to read computer cards, calculate average scores, and determine analysis of variance; results are printed out along with input data. 5 other programmes were written to store the data on disc and retrieve all, or part of, the information as needed. IFT

## 19

### Sensory evaluation by quantitative descriptive analysis.

Stone, H.; Sidel, J.; Oliver, S.; Woolsey, A.; Singleton, R. C.

*Food Technology* 28 (11) 24, 26, 28-29, 32, 34 (1974) [14 ref. En] [Dept. of Food and Plant Sci., Stanford Res. Inst., Menlo Park, California 94025, USA]

This article describes a sensory evaluation technique called quantitative descriptive analysis. The technique uses an interval scale and a panel of  $\geq 6$  trained panellists, and obtains repeated judgements from each panellist for each test product. Subject performance, scale performance, and product performance are determined by a means of a computer programme for the analysis of variance model which is consistent with the interval scaling technique. The results are then used to develop multidimensional models for use in subsequent consumer tests. IFT

## 20

### Compilation of odor and taste threshold values data. [Book]

Stahl, W. H. (United States of America, American Society for Testing & Materials) ((Editor)) v+250pp. (1973) [En] Philadelphia, Pennsylvania, USA; Price \$25; £12

The book, ASTM Data Series DS 48, contains tabulated threshold data of odour and taste; such data may be incorporated into regulatory specifications to define permissible odour limits, for example, from diesel-powered equipment or industrial waste discharges. Reliability of many of the values listed is questionable since experimental procedures and precautions followed in obtaining the data were seldom described in unequivocal terms. Standardization of test conditions is recommended. A clear consistent definition of threshold terminology is given. The book is divided into 3 sections. the first of which consists of an alphabetical listing of compounds together with a code number for each compound. The 2nd section is a table containing the code (acquisition) number and codes for modality (odour and taste), threshold type (detection, recognition, others), media, purity, threshold values and threshold units; it also contains mol. wt., Wiswesser Line Notation (WLN) and a reference for each compound. The 3rd section is a WLN permutation of threshold chemicals. DMK

## 21

[Standardization of sensory testing.] Zur Standardisierung der sensorischen Erzeugnisprüfung.

Neuman, R.; Arnold, S.; Molnar, P.

*Lebensmittel-Industrie* 21 (8) 352-360 (1974) [38 ref. De, en, ru] [Amt für Standardisierung,



Messwesen und Warenprüfung, Fachabteilung Nahrungsgüter, Fachgebiet Methodik, Berlin, German Democratic Republic]

Standardization of sensory testing of foods is discussed, with reference to: the importance of use of trained and tested taste panellists; standardization of test conditions and principles of quality evaluation; further development of point scoring systems; the optimum number of quality grades in sensory tests; and evaluation of the results. IN

## 22

### Sensory profiling of beer by a modified QDA method.

Mecredy, J. M.; Sonnemann, J. C.; Lehmann, S. J. *Food Technology* 28 (11) 36-37, 40-41 (1974) [4 ref. En] [Consumer Product Res. Dept., Jos. Schlitz Brewing Co., 1610 N. 2nd St., Milwaukee, Wisconsin 53212, USA]

A new technique called quantitative descriptive analysis was adapted to produce valid, reliable comparisons of major taste characteristics of competitive brands of beer. Profile characteristics are presented in a graphic form showing at a glance the similarities and differences among different beers. IFT

## 23

### Evaluation of methods for measuring texture using fresh apples as the test material.

Zaehring, M. V.; Hard, M. M.

*Canadian Institute of Food Science and Technology Journal* 7 (2) 125-129 (1974) [12 ref. En, fr] [Dept. of Home Economics Res., Agric. Expt. Sta., Univ. of Idaho, Moscow, Idaho, USA 83843]

2 laboratories used 3 varieties of apples as materials for standardizing and correlating various physical, chemical and sensory evaluations of texture. The criteria used to evaluate the appropriateness of the objective methods were: sensitivity to differences in texture; relationship to sensory assessments; and agreement between laboratories. The effectiveness of the methods in detecting differences in texture due to variety and storage conditions was remarkably similar in the 2 laboratories. For most of the methods, the relative SD was  $\leq 11\%$ . Correlations among the various pairs of methods differed with variety and with the basis used to calculate the correlation coeff. The 2 laboratories agreed substantially on the presence or absence of significance with respect to relationships between pairs of methods. The most appropriate objective measurement for evaluating texture appeared to be max. force. The possibility of using sp. gr. as a non-destructive method of measuring texture is suggested. AS

## 24

### Storage stability of hard-cooked eggs.

Oblinger, J. L.; Angalet, S. A.

*Poultry Science* 53 (4) 1415-1420 (1974) [11 ref. En] [Inst. of Food & Agric. Sci., Univ., Gainesville, Florida 32611, USA]

Hard-cooked eggs were stored both peeled and in the shell for 24 days at 25 and 5°C. Aerobic plate counts were determined throughout the storage period. Taste panel evaluations of flavour, texture, appearance and overall acceptability were conducted for the eggs stored at 5°C. A storage temp. of 25°C permitted rapid development of bacteria after one day of storage. Sliminess was visible on the peeled eggs after 4 days. Both peeled and shell hard-cooked eggs stored at 5°C failed to show any significant bacterial development until after 20 days of storage. No significant differences in flavour or overall acceptability, and only sporadic significant differences in texture and appearance, were detected among the hard-cooked eggs evaluated during 21 days storage at 5°C. AS

## 25

### [Results of taste tests on red wines from French-speaking Switzerland.]

Rochaiz, M.; Schopfer, J.-F.; Crettenand, J.

*Revue Suisse de Viticulture, Arboriculture, Horticulture* 4 (5) 175-179 (1972) [Fr, it, de]

Production of red wines in French-speaking Switzerland has increased from 5% of the total in 1950 to 25% in 1970. At the same time, the yield/m<sup>2</sup> has increased by 50%. Tasting tests on wines made from Gamay grapes, grown in the same vineyard but either allowed unlimited yields of 2-2.5 kg/m<sup>2</sup> or restricted yields of  $<1.5$  kg/m<sup>2</sup>, showed that the wines prepared from restricted yield grapes had a better colour, more body and fullness and were preferred by 85% of the tasting panel. It is concluded that the quality of wines is affected if the yield of grapes exceeds about 2 kg/m<sup>2</sup>. Further tasting tests with red wines that had been blended with up to 20% foreign wine showed wide variations in the preferences of the 400 members of the tasting panel. MEG

## 26

### Rheological and sensory evaluations of sweet corn maturity.

Tung, M. A.; Garland, M. R.; Maurer, A. R.; Watson, T. K.

*Canadian Institute of Food Science and Technology Journal* 7 (2) 136-143 (1974) [18 ref. En, fr] [Food Sci. Dept., Univ. of British Columbia, Vancouver 8, British Columbia, Canada]

Rheological parameters were compared with other objective tests to assess their relative merit as indices of sweet corn maturity and quality as determined by sensory evaluation. 3 sweet corn varieties, Mellogold, Trail Blazer and Jubilee, were harvested to provide a range from slightly immature to slightly over-mature. Rheological



parameters were determined on slurries of preblanched corn by applying power-law flow models to data obtained using the Haake Rotovisko and Brookfield viscometers. The Rotovisko flow behaviour index was almost equal to moisture content, refractive index, sp. gr. and yield in its correlation with days silking to harvest, used as the standard time index, and was superior to succulometer volume and tests using the Ottawa Texture Measuring System. The corn slurries decreased in pseudoplasticity as maturity advanced. Some of the other rheological parameters, Rotovisko apparent viscosity, and Brookfield consistency coeff. and flow behaviour index, were also well correlated with corn maturity. The corn was evaluated by sensory panels for succulence, tenderness/maturity, flavour and overall acceptability. Tenderness/maturity was generally more closely related to overall acceptability than were succulence and flavour. Correlations between the objective maturity parameters and sensory evaluations revealed that the Rotovisko flow behaviour index was equal to the good maturity indices in its correlation with panel parameters and was slightly superior in its relation with overall acceptability. AS

## 27

**Relationship between the GRL spaghetti tenderness tester and sensory testing of cooked spaghetti.**

Matsuo, R. R.; Irvine, G. N.

*Canadian Institute of Food Science and Technology Journal* 7 (2) 155-156 (1974) [8 ref. En]  
[Canadian Grain Commission, Grain Res. Lab., Winnipeg, Manitoba, Canada]

Trials using 8 samples of commercially processed spaghetti for textural assessment by sensory testing (firmness and chewiness), Instron Universal Testing Machine (shear force and stress), Ottawa Texture Measuring System, and Grain Research Laboratory (GRL) Tenderness Tester (tenderness index, compressibility and recovery) are reported. On the basis of this study, parameters obtained from the GRL apparatus can be used as an indication of textural characteristics, in terms of firmness and chewiness, of cooked spaghetti. AL

## 28

**Selecting tasting panels.**

Scholey, J.

*Food Progress* 2 (8) 1 (1974) [2 ref. En] [British Food Manufacturing Ind. Res. Assoc. Leatherhead, UK]

The type of taste panel selected depends on the purpose of the taste evaluation and the commercial value of results obtained. Tasting for consumer acceptability requires a panel of potential consumers, whilst semi-trained tasters are required for detecting small differences in particular product e.g. for detecting styrene contamination of butter. Expert tasters are used for examining the whole

flavour profile of a product. Panel size is briefly discussed. CDP

## 29

**The relationships between consumer criteria for choosing beef and beef quality.**

Forbes, S. M. C.; Vaisey, M.; Diamant, R.; Cliplef, R.

*Canadian Institute of Food Science and Technology Journal* 7 (2) 130-135 (1974) [11 ref. En, fr]  
[Fac. of Home Economics, Univ. of Manitoba, Winnipeg, Manitoba, Canada]

Rib steaks from 24 animals were selected to provide 6 sets of 4 distinct marbling levels, using Canada B grade beef for the lowest marbling level and Canada A grade for the 3 higher levels. Laboratory tests showed that raw steaks increased in % ether extract as marbling level increased. Raw steaks examined by a panel showed no consistent differences among the 3 A grade marbling levels in flesh firmness or grain fineness, although A steaks were detectably finer grained. After broiling A steaks were usually more tender and juicier than B steaks although no differences were evident among the 3 A grade marbling levels. Significant sensory differences between grades were found by a panel in juiciness and tenderness and by physical measurement of juiciness using the Carver Press, but 170 consumers demonstrated a significant visual preference for B grade raw steaks with no preference among the 3 A grade marbling levels. Criteria used by consumers in preference tests were the amount of marbling, amount of fat and colour of lean; few consumers were concerned about fat colour or firmness and texture of lean. All these features are recognized by Canada's new beef grading system, which appears to reliably distinguish between the eating quality of grade A and B beef. AL

## 30

**[Organoleptic analysis of sweeteners and sweet substances.] [Lecture]**

Watanabe, H.

*Japan Analyst [Bunseki Kagaku]* 23 (8) 957-961 (1974) [49 ref. Ja]

## 31

**Profile analysis and classification.** [Conference proceedings]

Vuataz, L.; Sotek, J.; Rahim, H. M.

*IV International Congress of Food Science and Technology 1a*, 25-27 (1974) [5 ref. En] [Nestle Products Tech. Assistance Co. Ltd., Res. & Development Dept., CH-1814 La Tour-de-Peilz, Case Postale 88, Switzerland]

Data analysis intended to reveal relationships between analytical measurements and organoleptic responses involves comparison of 2 sets of multivariate data and success is largely conditioned



by the reliability of organoleptic responses. The paper is restricted to a statistical study of the latter aspect, using a technique of profile sensory evaluation. Results obtained for 14 different chocolates and 12 organoleptic characters (8 flavour, 4 texture) are described to illustrate the checking of reliability of the panel. ELC

## 32

### Textured proteins: consumer acceptance and evaluation considerations.

Schutz, H. G.

*Cereal Science Today* 19 (10) 453-456, 467 (1974) [En] [Dept. of Consumer Sci., Univ. of California, Davis, California, USA]

## 33

### [Optimal sugar content of sparkling Muscatel.]

Drboglav, E. S.; Shol'ts, E. P.

*Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya* No. 3, 67-69 (1974) [7 ref. Ru] [Vses. Zaochnyi Inst. Pishchevoi Promyshlennosti, Moscow, USSR]

Results of several yr panel testing of sparkling Muscatels containing various amounts of sugar (3-13 g/100 ml) were mathematically processed. The aim was to establish the most favourable sugar content in the wine. The best organoleptic evaluation was for wine containing 1.5-9.5 g/100 ml. It is recommended that 60-80% of the must be made up of Muscatel grapes. STI

## 34

### A profile method for sensory analysis of beer and its use in assessing flavour stability and flavour consistency.

Soltoft, M.

*Journal of the Institute of Brewing* 80 (6) 570-576 (1974) [1 ref. En] [Alfred Jorgensen, Frydendalsvej 30, Copenhagen, Denmark]

A profile form for reporting in descriptive terms the sensory qualities of a beer sample is presented, and the importance of adopting a common vocabulary of terms related to tasting is stressed. Preconditions for subjecting taste reports to statistical analysis and computation are reviewed. The use of formalized taste reports, in connection with a standardized forcing procedure, in the assessment of flavour stability and flavour consistency is illustrated by an example. AS

## 35

### Sensory analysis of beer flavor. [Conference proceedings]

Lewis, M. J.; Pangborn, R. M.; Tanno, L. A. S. *Technical Quarterly, Master Brewers Association of America* 11 (2) 83-86 (1974) [2 ref. En, es] [Dept. of Food Sci. & Tech., Univ. of California,

Davis, USA]

Research into the analysis of bitterness intensity and the description of beer aroma and flavour are discussed, with special reference to the use of sensory panels. Using trained and 'consumer-type' panels beer bitterness has been examined and an attempt made to relate it to beer IBU's (international bitterness units) and storage conditions. It was found that beer bitterness was negatively correlated with degree of liking, and positively correlated with IBU's. Thus, IBU's are an acceptable measure of bitterness, but more bitter beers were less liked by the judges. During storage desirable IBU bitterness is lost and is replaced (to an extent depending on storage temp.) by a new bitterness sensation not related to IBU's. Thus, there are quantitative and qualitative changes in beer bitterness, related to conditions of storage. Subsequent experiments with the panel demonstrated that bitter aftertaste increased significantly with temp. of storage. This is probably the character that accounted for change in the quality of beer bitterness during storage. IBU detn. is inadequate to measure this change. AA

## 36

### Flavor and threshold of beer volatiles. [Conference proceedings]

Meilgaard, M.

*Technical Quarterly, Master Brewers Association of America* 11 (2) 87-89 (1974) [En, es] [Stroh Brewery Co., Detroit, Michigan, USA]

Results are presented of a study on the flavours and thresholds of 222 compounds added to beer. In each group (e.g. alcohols, esters, aldehydes) it was found that low mol. wt. compounds with 1-4 carbon atoms had high flavour thresholds, i.e. weak flavours. With increasing chain length of the molecule, the flavours became stronger until a max. flavour strength was reached, which for most groups of aliphatic compounds occurred at 8-10 carbon atoms. Longer-chain molecules again had weaker flavours, of a fatty nature. These facts support the hypothesis that high flavour strength requires a certain solubility in both the lipophilic and hydrophilic portions of the olfactory membrane. Adequate purification before tasting was found to be of the highest importance; each compound must be purified to constant flavour and threshold before reliable data can be obtained. The need for further research into the flavour of beer is noted. AA

## 37

### Descriptive flavor terminology. [Conference proceedings]

Palamand, S. R.

*Technical Quarterly, Master Brewers Association of America* 11 (2) 90-93 (1974) [4 ref. En, es] [Tech. Centre, Anheuser-Busch Inc., St. Louis, Missouri, USA]

Ways in which flavour panels can be used in beer quality control and research are discussed, with

special reference to the need for uniform descriptive terminology of the flavours encountered in tasting; this would facilitate panel-to-panel or laboratory-to-laboratory communication. AA

### 38

**Taste panel methods in a flavor evaluation program.** [Conference proceedings]

Einstein, M. A.

*Technical Quarterly, Master Brewers Association of America* 11 (2) 94-99 (1974) [3 ref. En, es] [Rainier Brewing Co., Seattle, Washington, USA]

Flavour evaluation of beer by taste panels is discussed with reference to: test design and methodology; shelf-life testing; evaluation of beers with potential flavour changes; and consumer evaluation of product flavour. AA

### 39

**Wine tasting and judging.**

Rankine, B. C.

*Food Technology in Australia* 26 (10) 443-445, 447-449, 451-453 (1974) [20 ref. En] [Australian Wine Res. Inst., Adelaide, South Australia, Australia]

Methods of wine appreciation and judging in Australia are discussed. The following aspects are considered: physical conditions for tasting (order of wines and type of glass); wine tasting procedure (difference tasting and flavour profile analysis); wine scoring systems; wine judging in Australia; schedule of wine classes and regional wine shows. Aspects and problems of wine judging discussed are palate fatigue and standards. Selection of judges and a comparison of judging procedures are also considered. 3 appendices are included: Wine specifications of the Federal Wine and Brandy Producers' Council of Australia; Comparison of 2 overseas wine scoring systems (International and University of California system); and Uniform wine and brandy show schedule. VJG

### 40

**Panel grading of butter - a feasibility study.**

[Conference proceedings]

Puri, S. C.

*XIX International Dairy Congress* 1E, 677 (1974) [En] [Production & Marketing Branch, Agric. Canada, Ottawa, Canada]

An outline is given of an experiment, currently in progress, in which consistency and uniformity of responses of panelists to 4 important butter flavour defects are being studied together with the discriminatory aspect of the grading system for specific defects. MC

### 41

**Factors affecting meat purchases and consumer acceptance of ground beef at three fat levels with and without soya-bits.**

Mize, J. J.

*Southern Cooperative Series Bulletin* No. 173, 38pp. (1972) [En]

A consumer panel of 649 randomly selected urban households from 5 Southern States of the USA were provided with 6 ground beef samples in random sequence with 15, 25 and 35% added fat, and 2% soybits in  $\frac{1}{2}$  of the samples. Samples with 15% added fat both with and without soybits received the highest mean scores for all palatability characteristic measured. Soybits increased the mean scores at all levels of added fat. Mean scores for flavour showed the products to be highly acceptable. Significant differences were found for flavour, tenderness and overall score but not for juiciness. Low fat samples scored considerably higher flavoured scores, the 15% fat samples scoring highest followed by 25% fat with 2% soybits. RM

### 42

**[Principles and techniques of organoleptic quality control.]**

Eccher, P.

*Scienza e Tecnologia degli Alimenti* 4 (5) 275-280 (1974) [15 ref. It, en] [Istituto Sperimentale per la Valorizzazione Tecnologia dei Prodotti Agric., Milan, Italy]

After an introduction on preference and discrimination tests in organoleptic food analysis, problems arising in tests are discussed, viz. selection of panels, control of test conditions and motivation of judges. The principal methods of quality evaluation are briefly described, including paired comparison, triangular test, score method, order of preference, detn. of threshold values, and analysis of quality properties (e.g. flavour profile, texture profile). RM

### 43

**Validation of sensory and instrumental analyses for flavor.** [Conference proceedings]

Powers, J. J.

*IV International Congress of Food Science and Technology* 3, 19-21 (1974) [En] [Dept. of Food Sci., Univ. of Georgia, Athens, Georgia 30602, USA]

Good correlations between sensory and chemical evaluation of flavour require that subjective and objective errors are low and known. Validation procedures are thus necessary for both types of analysis, and should not be carried out independently of each other. Statistical procedures are regularly used, and high-speed computing makes additional tests practical. Validation trials consist of adding known compounds to determine if they affect the flavour as predicted, successfully predicting flavour quality of subsequent samples from purely objective data, or formulating model mixtures. AL



## 44

**Beer flavor and implications of oxidation during brewing.**

Gheluwe, G. E. A. van; Valyi, Z.

*Technical Quarterly, Master Brewers Association of America* 11 (3) 184-192 (1974) [67 ref. En, es] [Molson Breweries of Canada Ltd., Montreal, Quebec, Canada]

An expert panel can rank both ales and lagers according to age up to 4 months in 1-month increments. Copper-catalysed oxidase and peroxidase activity during mashing are both important factors contributing to polymerization of polyphenols. Oxidized polyphenols impart an aged note to beer. Promoting haze formation by oxidation during mashing may solve the haze problem but results in a harsh, lingering aftertaste in the beer and the formation of precursors of stale flavour. Fermentations, both ale and lager, should be conducted at temp. as low as possible. Air accumulation should be avoided at all costs from the end of fermentation. The 'spring analogy' is invoked to explain why large variations in redox potential between wort and end-fermented beer are deleterious. Results of a series of experimental brews show that, by inhibiting oxidase activity during mashing, the resulting beer contains less anthocyanogens and catechins. AS

## 45

**Relationship of furfural to temperature abuse and flavor change in commercially canned single-strength orange juice.**

Nagy, S.; Dinsmore, H. L.

*Journal of Food Science* 39 (6) 1116-1119 (1974) [24 ref. En] [USDA, Citrus & Subtropical Products Lab., Agric. Res. Service, Winter Haven, Florida 33880, USA]

Furfural was determined in canned single-strength orange juice during storage at 40°, 60°, 70° and 95°F for 12 wk. Factors affecting the formation of furfural were temp., length of storage, pH, % citric acid and vitamin C. Taste-panel evaluation of juices from several processing plants during Nov.-Jan., Feb.-April and April-May and May-July seasons indicated that highly significant flavour changes ( $P < 0.001$ ) occurred when the level of furfural exceeded 72 µg/l. Furfural-flavour change thresholds ranged from 18 µg/l. to 72 µg/l. Analysis of variance for the mean values (Nov.-Jan., 38.6 µg/l.; Jan.-March, 52 µg/l.; April-May, 38.1 µg/l.; May-July, 29.8 µg/l.) indicated a difference between the Jan.-March and May-July processing periods at the 1% level of significance. Furfural should be regarded strictly as an indicator of the degree of flavour change. IFT

## 46

**Comparison of the palatability of goat meat and meat from four other animal species.**

Smith, G. C.; Pike, M. I.; Carpenter, Z. L.

## 47

*Journal of Food Science* 39 (6) 1145-1146 (1974) [9 ref. En] [Dept. of Animal Sci., Texas Agric. Expt. Sta., Texas A&M Univ., Coll. Sta., Texas 77843, USA]

5 sensory panels, involving 269 untrained members, were used to compare palatability attributes of goat meat and meat from 4 other animal spp. Rib or loin samples from the carcasses of 109 goats, 71 lambs, 34 beef cattle, 30 pigs and 1 horse were cooked to an internal temp. of 75°C for subsequent sensory evaluation. The panels were not informed of the purpose of the test, or that samples were derived from animals of different spp. Goat meat was less desirable ( $P < 0.05$ ) in flavour than pork in 3 of 5 comparisons, but was not decidedly different in flavour from samples of beef, lamb or horse meat. Goat meat was not significantly different in juiciness from pork and was rated higher in juiciness than was horse meat. Goat meat was as juicy as lamb and beef in 3 and 4, respectively, of 5 sensory panel comparisons. Goat meat was less tender than lamb, beef or pork in 4 of the 5 panel tests. In the fifth panel comparison, meat from Cabrito and kid goat carcasses was more tender than that from more mature horse and beef carcasses. Overall satisfaction ratings revealed that goat meat was less desirable than lamb, beef and pork in 4, 4 and 3 sensory panel tests, respectively. In a single comparison, goat meat was more satisfactory overall than was horse meat. These data suggest that broiled goat meat has unique palatability attributes, being less desirable in flavour than pork and less tender than pork, beef or lamb and thus would not be interchangeable with meat of comparable maturity and fatness from the other farm animal spp. IFT

## 48

**Yield, composition and acceptability of meat from Chukar partridge.**

Gertonson, E. H.; Dawson, L. E.; Coleman, T. H. *Poultry Science* 53 (5) 1819-1823 (1974) [5 ref. En] [Dept. of Food Sci. & Human Nutr., Michigan St. Univ., East Lansing, Michigan 48824, USA]

Battery-reared male and female Chukar partridge were processed at 14, 16 and 20 wk of age. Ready-to-cook yields (from live wt.) were similar for male and female birds, averaging 73.5%. Meat yields and compositions, cooking losses and panel acceptability were determined for oven cooked birds. Total cooked yields, which varied from 80 to 85%, were similar for males and females and remained fairly constant for birds 14-20 wk of age. Boneless cooked meat yields were high (75% of cooked carcass wt. with slightly less than one half from breast muscles. Cooked meat plus skin samples contained 25% protein, 5% crude fat and 69% moisture. Oven-cooked partridge were found acceptable by the taste panels. AS

## 49

**Identification and evaluation of the flavor-significant components of ginger essential oil.** Bednarczyk, A. A.

*Dissertation Abstracts International*, B 35 (1) 306: Order No. 74-16558 (1974) [En] [Univ. of Maryland, College Park, Maryland, USA]

Significant flavour compounds in ginger essential oil were selected statistically using a step-wise multiple regression analysis which treated individual peak quantities on a gas chromatogram as independent variables and taste panel scores for ginger flavour intensity as dependent variables. Statistical analysis showed that 4 GLC peaks consisting of  $\alpha$ -terpineol, citral a, citral b,  $\beta$ -sesquiphellandrene, ar-curcumen, nerolidol, and a sesquiterpene alcohol accounted for 85% of the panel's flavour response. A second sesquiterpene alcohol was also a significant flavour contributor. The 2 sesquiterpene alcohols were given the names cis and trans  $\beta$ -sesquiphellandrene. The contribution which the individual components make to ginger flavour is considered. A trained sensory panel judged a mixture of  $\alpha$ -terpineol, citral a, citral b,  $\beta$ -sesquiphellandrene, ar-curcumen and nerolidol as being characteristic of ginger oil. A mixture of these chemicals, in combination with ginger heat chemicals, was judged as being a suitable imitation ginger flavour by a trained sensory panel. VJG

## 50

**Meanings of flavours and textures.**

Jellinek, S.

*World Food Review* No. 1, 8-9 (1975) [En]

15 words denoting flavour qualities were selected on the basis of general familiarity, uniformity of meaning for different respondents in different parts of the US and coverage of a broad spectrum of flavour types. 170 adults, aged 20-60, were given a list of the flavour words and a list of eating times and asked to indicate for each flavour word, which 2 eating times went best with that flavour, and which 2 went least well with it. The respondents were also given a list of eating situations and a list of people types. The associations between these items and flavour words were similarly obtained. The results are presented in tabular form. VJG

## 51

**[Corrected table for the statistical interpretation of the tetradic test.]** Korrigierte Tabelle für die statistische Auswertung des Tetraden-Tests. Heidema, J.

*Zeitschrift für Lebensmittel-Untersuchung und -Forschung* 155 (5) 297-298 (1974) [3 ref. De, en] [Unilever Forschungslab. Duiven, Zevenaar, Netherlands]

A corrected table is presented for the statistical evaluation of the tetradic test of Renner & Römer [FSTA (1973) 5 8A394]. [See following abstr.] SKK

## 52

**[Statistical interpretation of the tetradic test.]** Zur statistischen Auswertung des Tetraden-Tests. Renner, E.; Römer, G.

*Zeitschrift für Lebensmittel-Untersuchung und -Forschung* 155 (5) 298-299 (1974) [6 ref. De, en] [Milchwirtschaftliche Abteilung Justus Liebig- Univ., Giessen, Federal Republic of Germany]

It is stated in this note that the correction suggested in the preceding abstr. is unnecessary. An addendum by Heidema points out that the criticism of Renner & Römer arose from the assumption that the corrected table was based on the  $\chi^2$  test, whereas it was based on binomial distribution; and in a further addendum, Renner considers that both tables are correct and their use a matter of personal choice. SKK

## 53

**Selected and standardized values of suprathreshold odor intensities for 110 substances.**

Patte, F.; Etcheto, M.; Laffort, P.

*Chemical Senses and Flavor* 1 (3) 283-305 (1975) [69 ref. En] [College de France, 11 Place Marcelin Berthelot, 75231, Paris, France]

The suprathreshold olfactory intensity of pure chemical substances can be expressed as a function of 3 biological parameters characteristic of each substance. These parameters are the detection threshold, the slope of perceived intensity vs. concn. in log. log. coordinates, and a ceiling to this slope of either physical or biological origin. This study represents an attempt at compiling thresholds, intensity slopes and slope limits determined by many authors, and the selection and standardization of these data based on objective criteria. The selected results include 110 slopes, 124 thresholds, 78 biological limits and 110 physical limits. AS

## 54

**An apparatus based on turbulent mixing for delivery of odorous stimuli.**

Doving, K. B.; Schieldrop, B.

*Chemical Senses and Flavor* 1 (3) 371-374 (1975) [10 ref. En] [Inst. of Zoophysiol., Univ. of Oslo, Blindern, Norway]

A simple olfactometer adaptable for animal and human experimentation is described. The apparatus is based on a principle of thorough turbulent mixing and allows accurate detn. of stimulus composition, concn. and duration. Several odours might be introduced simultaneously. The apparatus works both with gas and liquid. AS

## 55

**Some chemicals representing particular odour qualities.**



Harper, R.

*Chemical Senses and Flavor* 1 (3) 353-357 (1975)  
[45 ref. En] [Dept. of Food Sci., Univ., Reading,  
RG1 5AQ, UK]

A list of chemicals representing 44 odour qualities (such as burnt, fishy, fruity, metallic, spicy, warm, etc.) is given. It summarizes the collective view of 7 experts on the question of which chemical substances of high purity best represent particular odour qualities. AL

## 56

### Odor intensity: Mixtures and masking.

Cain, W. S.

*Chemical Senses and Flavor* 1 (3) 339-352 (1975)  
[25 ref. En] [John B. Pierce Foundation Lab. and  
Yale Univ. School of Med., New Haven,  
Connecticut, USA]

Subjects estimated the odour intensity of mixtures of 2 odorants, 1-propanol and n-amyl butyrate, mixed either in the vapour phase or presented separately to the 2 nostrils simultaneously. Both types of mixture yielded similar results. In all instances, the perceived intensity of the mixtures was lower than the sum of the intensities of the unmixed components, and in some instances even fell between the intensities of the unmixed components. Each component of the mixtures displayed some ability to mask the other component. A model of vector summation provided a good description of the relation between intensity of a mixture and intensities of the unmixed components. The experiments reveal the general nature of how chemically unreactive deodorizers and masking agents exert their effects. AS

## 57

### Recognition memory for odors.

Lawless, H. T.; Cain, W. S.

*Chemical Senses and Flavor* 1 (3) 331-337 (1975)  
[16 ref. En] [John B. Pierce Foundation Lab. and  
Yale Univ. New Haven, Connecticut, USA]

Recognition tests demonstrated unique features of odour memory. The forgetting curve over a span of 1 month showed a very slow decay from an initial performance of 85% correct recognition, a finding that contrasts with the rapid decay for stimuli presented to other sense modalities. The variables of labelling, codability, serial position, and retention interval had little or no effect on performance. Even variables of familiarity and pleasantness, salient aspects of odour experience, had no effect on recognition. Hence, the connection between linguistic processing and odour recognition is weak. AS

## 58

### Ratio scales and category scales of odour intensity.

Piggott, J. R.; Harper, R.

*Chemical Senses and Flavor* 1 (3) 307-316 (1975)  
[25 ref. En] [Food Sci. Dept., Univ., Reading,  
RG1 5AQ, UK]

The relation between a ratio scale (RS) obtained by magnitude estimation (ME) and a category scale (CS) of the odour intensity of 1-butanol was studied, together with individual variations in the RS. Series of solutions of butanol in water in small bottles were presented to a panel for judgement, half using the ME method and half a CS. Plots were made of the CS against the RS, and the RS's of individual panel members were analysed. A power function exponent of 0.48 was found for the panel's RS, with individual values ranging from 0.25 to 0.49. The CS was curved relative to the RS; variability of the magnitude estimates was approx. proportional to the magnitude estimates; and a small time-order error was found. Odour intensity exhibited the 3 tested characteristics of a prothetic continuum, and the variability of individual exponents was not as great as sometimes suggested. AS

## 59

### A comparative study of the olfactory sensitivity of humans and rats.

Laing, D. G.

*Chemical Senses and Flavor* 1 (3) 257-269 (1975)  
[23 ref. En] [CSIRO Div. of Food Res., North  
Ryde, NSW 2113, Australia]

Olfactory sensitivity of humans and rats to n-propanol, n-heptanol, benzaldehyde, isobutyl-n-butyrate, cyclohexanone and 1,4-dioxane (rats only), was determined. Similar results were obtained for both spp., and these compare favourably with those of other workers. Since the sensitivities of humans and rats varied for different odorants in a similar manner, it is postulated that the mechanisms for detecting odours may be common to many vertebrates. It is proposed, in agreement with earlier workers, that the relative area of the olfactory epithelium does not necessarily determine the sensitivity of an animal. AS

## 60

### The influence of alcohol on odor detection.

Engen, T.; Kilduff, R. A.; Rummo, N. J.

*Chemical Senses and Flavor* 1 (3) 323-329 (1975)  
[17 ref. En] [Brown Univ., Providence, Rhode  
Island 02912, USA]

A signal detection experiment showed that human subjects whose blood alcohol level was approx. 70 mg% were more sensitive to a 'burnt' odour (guaiacol) than control subjects. The most plausible explanation for this finding seems to be that alcohol affects the accessibility of odorous molecules at the olfactory epithelium. AS

## 61

### Individual and substance differences in the discriminability of optical isomers.

Jones, F. N.; Elliot, D.

*Chemical Senses and Flavor* 1 (3) 317-321 (1975)



[17 ref. En] [Univ. of California, Los Angeles, California, USA]

An analysis of the discriminability of 10 enantiomeric pairs of substances (carvone, coniine,  $\alpha$ -pinene,  $\alpha$ -phenethylamine,  $\alpha$ -phenethyl alcohol, 2-butanol, 2-hexanol, 2-heptanol, 2-octanol,  $\alpha$ -phenylbutyric acid) revealed both significant individual differences among the 31 panelists and significant differences in discriminability of the substances. Since a significant panelist by substance interaction was found, a factor analysis was applied to the data. 2 factors were found. It was suggested that different protein binding sites would account for the results. AS

## 62

[Objective organoleptic quality evaluation of salted cucumbers.]

Chuzhova, I. M.

*Konservnaya i Ovoshchesushil'naya*

*Promyshlennost'* No. 5, 35-37 (1974) [Ru]

[Leningradskii Inst. Sovetskoi Torgovli im. F. Engel'sa, USSR]

A new 30-point system for organoleptic evaluation of salted cucumbers is proposed. The basic indices and numbers of points awarded are: shape and size, 1-3; colour, 1-3; structure and consistency, 1-3; taste and aroma, 1-3; and salt infusion quality, 1-3. The points awarded for these basic indices are multiplied by a "coeff. of importance", namely 4 for taste and aroma, 3 for structure and consistency and 1 each for the other indices. This gives a max. of 30 points. The rating structure is: 1st quality, 25-30 points; 2nd quality, 15-20 points; 3rd quality, 5-10 points. Evaluation of different kinds of salted cucumbers showed the best to be the hybrid "Plodovistyi 147  $\times$  07-63" with 28 points, followed by the hybrid "VIR 521" with 26.5 points and "VIR 507" with 25 points. STI

## 63

**Rich flavor discrimination in ice cream by theory of signal detection.**

Stull, J. W.; Angus, R. C.; Taylor, R. R.; Swartz, A. N.; Daniel, T. C.

*Journal of Dairy Science* 57 (12) 1423-1427

(1974) [7 ref. En] [Dept. of Dairy and Food Sci., Agric. Economics and Psychology, Univ. of Arizona, Tucson, Arizona 85721, USA]

27 ice cream samples varying in fat (10, 12 and 14%), overrun (78, 90 and 102%) and vanilla extract (none, normal, and 3  $\times$  normal) were presented to an observer panel for rich flavour discrimination evaluation. The experimental design was based on the theory of signal detection. The panel could discriminate between levels of rich flavour intensity. A brief richness/ingredient cost analysis was made. The richest ingredient combination with least cost contained 14% fat, 102% overrun and normal flavour. The least rich combination with lowest cost had 10% fat, 102% overrun and no flavour. AS

## 64

**Fat/overrun relationships in ice cream.**

Stull, J. W.

*Dairy and Ice Cream Field* 157 (11) 48B (1974)

[En] [Dept. of Dairy & Food Sci., Univ. of Arizona, Tucson, Arizona, USA]

Ice cream with 10-14% fat and 78-102% overrun was tested for 'richness' by an observer panel, using a 10-point scale. The highest 'richness' rating of 7.2 was given to 14% fat ice cream processed to 102% overrun, whilst ice cream with 10% fat and 102% overrun was given the lowest rating (1.5). (See also preceding abstr.) FL

## 65

**Storage behavior of ice cream stored at various temperatures between -18°C and -50°C.**

[Conference proceedings]

Adam, R.; Spiess, W. E. L.

*IV International Congress of Food Science and Technology* 2, 44 (1974) [En] [Engesserstrasse 20, 75 Karlsruhe, Bundesforschungsanstalt für Lebensmittelfrischhaltung, Federal Republic of Germany]

Quality changes of ice cream stored at various temp. between -18°C and -50°C were studied over a period of 12 months by physical and sensory quality evaluation methods. The results show that it is possible to describe the quality loss which occurs especially at elevated temp. by means of surface area measurements and overrun estimations. This combination of quality evaluation methods allows time/temp. conditions for the short-term storage of ice cream to be established. AS

## 66

**[Screening of panelists for their suitability in sensory tests.]**

Teleky-Vamosy, G.

*Élelmiszeri Ipar* 28 (11) 327-331 (1974) [7 ref.

Hu, ru. de, en] [Közp. Élelmiszeripari Kutató Int., Budapest, Hungary]

In the method described, 4 base solutions (sweet, salty, acid and bitter) are used to test flavour differentiation ability. These solutions contain 0.8 g sucrose, 0.2 g NaCl, 0.2 g citric acid and 0.00029 g quinine, respectively, in 100 g water. The correct taste perception is calculated by the binomial distribution and the results are evaluated by statistical methods. Threshold values of the taste perception of 8 panelists are tabulated and evaluated on the basis of probit analysis. The procedure developed proved satisfactory in practical sensory tests carried out in the Hungarian Central Food Industry Research Institute. IF

67

[Proposed Spanish terminology for sensory analysis. I.]

Cabezudo, M. D.

*Alimentaria* 10 (48) 83, 85-87, 89 (1973) [Es]

68

**The Texture Profile: its foundations and outlook.**

Moskowitz, H. R.; Kapsalis, J. G.

*Journal of Texture Studies* 6 (1) 157-166 (1975) [19 ref. En] [US Army Natick Lab., Massachusetts 01760, USA]

The origins of the Texture Profile are traced from antecedent developments both in food science and in psychology. A variety of theoretical underpinnings of the Profile are considered: selection of texture variables; problem of standards in texture; appropriate rules for measuring psychological magnitudes; appropriate sensory-instrumental functions; combination rules whereby the observer combines different texture attributes and relates each attribute to a linear combination of others; and interaction between users of the Texture Profile. In each of the above, the underlying assumptions are discussed and possible modifications are suggested in order to generalize the procedure. AS

69

**Training a sensory texture profile panel and development of standard rating scales in Colombia.**

Bourne, M. C.; Sandoval, A. M. R.; Villalobos C., M.; Buckle, T. S.

*Journal of Texture Studies* 6 (1) 43-52 (1975) [5 ref. En] [Inst. de Investigaciones Tecnológicas, Avenida 30 No. 52-A-77, Bogotá, DE, Colombia]

2 texture profile panels and 2 panel leaders were trained in the General Foods Sensory Texture Profiling Technique in Colombia using Colombian foods as reference points on the standard rating scales. Foods included various cheeses, egg white, frankfurters, peanuts, carrots, milk candy, biscuits, toast, broad beans, meringue, chocolate candy, flour pastes, margarine, milk dessert, sugar syrups and sweetened condensed milk. The texture profiling technique adapted to Colombian conditions very successfully. The trained texture profile panel is now playing an essential part in the development of protein-fortified staple foods of acceptable textural quality for Colombia. AS

70

**Modifications and applications to foods of the General Foods sensory texture profile technique.**

Civille, G. V.; Liska, I. H.

*Journal of Texture Studies* 6 (1) 19-31 (1975) [8 ref. En] [General Foods Corp., Corporate Res. Dept., White Plains, New York 10625, USA]

The primary attributes of the General Foods sensory texture profile technique are

standardization, reproducibility, and ease of correlation with instrumental measurements. Since the original publication [Journal of Food Science (1963) 28, 404], the method has undergone modifications and refinements such as: addition of an initial stage for evaluation of surface properties, evaluation of certain mechanical characteristics of elasticity and cohesiveness on specific products, and development of texture profile techniques and terminology for the evaluation of semi-solids. Application of this expanded texture profile method is demonstrated using foods such as vanilla cookies, frankfurters, and whipped toppings. AS

71

**[Survey on food taste of 3-year-old children. I. On the taste degree per child with his (or her) mother and the taste degree per food.]**

Matsudaira, T.; Sasaki, I.; Uoya, S.

*Japanese Journal of Nutrition [Eiyogaku Zasshi]* 32 (6) 278-287 (1974) [7 ref. Ja, en] [Public Health School of Osaka Prefecture, Osaka, Japan]

72

**New pathways in psychorheology. [Review]**

Drake, B.; Akesson, C.

*Dechema-Monographien* 77, 403-426 (1974) [many ref. En, de, fr] [Swedish Inst. for Food Preservation Res., Göteborg, Sweden]

The discipline of psychorheology is placed in its context, and the short history is reviewed. Thereafter, more important aspects of stimulus, response, semantics, and correlation/regression procedures are dealt with. It is concluded that there is still no all-embracing theory available. In principle, this implies that we are still far from being able to achieve psychorheological predictions with general validity. AS

73

**Effect of gamma rays on shelf life and quality of orange juice.**

Hussain, A.; Maxie, E. C.

*International Biodeterioration Bulletin* 10 (3) 81-86 (1974) [23 ref. En, fr, de, es] [Coll. of Agric., Agric. Expt. Sta., Dept. of Pomology, Univ. of California, Davis, California 95616, USA]

The juice of freshly harvested Washington Navel oranges was inoculated with  $10^7$  cells/ml of 24 h old suspension of *Saccharomyces cerevisiae* var. *ellipsoideus*, and then treated as follows: (i) irradiated with doses 250-1000 krad; (ii) heated for 20 min at 45, 50 and 55°C; (iii) heated at 45, 50 and 55°C either before or after irradiation with doses of 100-500 krad. Acceptability of the orange juice was determined organoleptically by a panel of 9 judges on a 9-point hedonic scale. Untreated orange juice cannot be stored at room temp. for >4 days, but heated samples (50°C for 20 min) can be stored for ≤6 days. Heat treatment after irradiation resulted in longer storage life (16 days) compared to heat treatment before irradiation (12 days).



Effective radurization of orange juice with quality approaching normal was achieved by a dose of 300 krad gamma rays followed by heating for 20 min at 50°C. Loss of ascorbic acid and total carotenoids was greater by radiation alone (1000 krad) as compared to combined irradiation-heat treatment. Although the combined radiation heat treatment improved storage life the process cannot be commercially used due to lack of clearance for human consumption by the government health authorities. VJG

## 74

**Creatine thresholds and implications for flavor of meat.**

Russell, M. S.; Baldwin, R. E.

*Journal of Food Science* 40 (2) 429-430 (1975) [15 ref. En] [Dept. of Food Sci. & Nutr., Univ. of Missouri, Columbia, Missouri 65201, USA]

Detection thresholds for creatine in aqueous solutions were determined for 52 out of 54 individuals. A bimodal trend was apparent with 23% of the subjects differentiating between the solution containing 130.0 g creatine/100 ml  $\times 10^{-2}$  and distilled water and 21% detecting the difference at a concn. of 0.41 g/100 ml  $\times 10^{-2}$ . 65% of the subjects classified the taste of creatine as bitter. The level of creatine in meat is high enough to elicit a response in sensitive individuals. IFT

## 75

**[Some physiological and psychophysical observations concerning the taste perception of test subjects.]**

Kouwenhoven, T.

*Mededelingen, Landbouwhogeschool, Wageningen* No. 74-13, 86pp. (1974) [many ref. Nl, en] [Landbouwhogeschool, Wageningen, Netherlands]

After discussing factors affecting choice of food, the reasons for sensorial experiments, and threshold values, the author describes his own experiments. These showed that the mean threshold values resulting from an arbitrarily increasing series of 15 concn. of taste substances (sucrose, lactic acid and NaCl) were identical to those from a geometrical progression of 12 concn. An experiment involving demineralized water as placebo showed that the pattern of incorrect responses to the placebo varied between good and poor tasters: good tasters tended to describe it as sweet and poor tasters as bitter. The effects of training and experience on taste perception were also studied, as well as the effects of colour. ADL

## 76

**First tasting of experimental wines.**

Anon.

*Australian Wine Brewing and Spirit Review* 93 (1) 26, 28, 30 (1974) [En]

Experimental wines made from recently introduced grape var. were evaluated by tasters using a scoring system of: 5 very good; 4 good; 3 average; 2 below average; and 1 poor. Results for white and red wines were: 5 (white) Fernao Pires, (red) Merlot, Ruby Cabernet; 4-4.9 (white) Chardonnay, late French Columbard, (red) Cabernet Franc, Cabernet Sauvignon, Early Burgundy, Lagrain, Malbec, Royalty, Shiraz, Ughetta; 3-3.9 (white) Clairette, Flora Inzolia, late Rhine Riesling, late Semillon, Sylvaner and (red) Barbera, Carignu, Cortex, Durif, Fresia, Garney, Meunier, Mondeuse, Pirot Noir, St. Macaire, Tannat, Teroldico, Xeres and Zinfandel. 14 other var. (8 white, 6 red) were <3.0. AA

## 77

**[Relationships between physico-chemical parameters of beer and the results of tasting.]**

Moll, M.; Flayeux, R.; That, V.; Noel, J.-P.

*BIOS* 5 (9) 328-333 (1974) [50 ref. Fr, en, de] [Centre de Recherche et Developpement Tepral, 2 Rue Gabriel-Bourg, 54520, Champigneulle, France]

58 commercial samples of beer (with a wort density of 11-16°Plato) were examined by taste panels, and the results compared with measurements of 51 chemical and physical variables. Statistical (total discriminatory) analysis showed that 38 variables could be used to classify beer as good or passable. Using 8 of these variables (contents of 3 amino acids, 3 volatiles and 1 metal and the amount of bitterness), the result of the taste panel could be forecast with a certainty of 80.5%. In studies with beer produced in 1 brewery (but using 3 manufacturing methods), principal component analysis allowed the beers to be classified as good, medium or poor, according to 12 taste variables. With the exception of 2 beers, a similar classification was obtained using total discriminatory analysis of 17 physico-chemical variants (ethyl, isobutyl and isoamyl acetates, propanol, isobutanol, isoamyl alcohol, ethyl caproate and caprylate, caproic, caprylic and capric acids,  $\beta$ -phenyl ethanol, total volatiles,  $K^+$ ,  $Na^+$ ,  $Ca^{2+}$  and  $Mg^{2+}$ ). Using only 7 of these variables (5 volatiles and 2 minerals) classification of the beer can be forecast with 82.4% probability. MEG

## 78

**[Relationships between the variables defining the stages of beer manufacture.]**

Noel, J.-P.; Bauer, G.

*BIOS* 5 (9) 355-366 (1974) [Fr] [Brasserie Kronerbourg, 67037 Strasbourg-Cedex, France]

The effects of malt quality and of manufacturing procedures on the characteristics of the wort and on the final composition of the beer (including taste panel assessments of quality) were studied. Using



principal component and discriminatory analyses, it was found that measurement of the contents of ethyl acetate, ethyl caproate, ethyl caprylate, propanol, isobutanol, isoamyl alcohol and caprylic and caproic acids enabled 85% of certain types of beer to be classified in the same manner as by an expert taste panel. The advantages of using physico-chemical tests for quality control are discussed.

MEG

## 79

**[Chemical composition, organoleptic quality and nutritional value of the main varieties of soybeans grown in the state of Sao Paulo.]**

Costa, S. I. da; Miya, E. E.; Fujita, J. T.

*Coletanea do Instituto de Tecnologia de Alimentos* 5, 305-319 (1973/1974) [12 ref. Pt, en]

The composition and properties of 7 soybean var. were studied. Protein, oil, fibre, ash, urease and amino acid contents of all var. were roughly similar, but var. IAC-1 contained more oleic and less linoleic acid than the others (34.6% vs. 19.1-26.8 and 43.2 vs. 53.0-61.3%), with a consequent lower I value (119.0 vs. 125.1-133.1). Taste panel evaluation of full-fat flour was analysed statistically to place the var. in order of preference. Nutritive value of flours determined by rat protein efficiency ratios showed that var. IAC-2 and Santa Rosa were superior to casein (not statistically significant). These 2 var. and var. Davis were also most acceptable and appear best suited for human consumption. RM

## 80

**Production of lamb with poly-unsaturated depot fats (from feeding a dietary supplement of formaldehyde-treated ground sunflower seed).**

Jagusch, K. T.

*New Zealand Journal of Agricultural Research* 18 (1) 9-12 (1975) [20 ref. En] [Lincoln Coll., Canterbury, New Zealand]

Eight Coopworth and eight Poll Dorset ewe lambs were used in two experiments respectively to determine how quickly the animals adapted to feedlot from grass pasture, and responded to being fed a supplement of ground sunflower seed treated with formaldehyde so that the oil (70% linoleic acid) resisted biohydrogenation in the rumen. It was found that the level of linoleic acid in the perirenal fat of Coopworth lambs increased from 3 to 14% in a period of 40 days when they consumed an average of 100 g lipid/head daily and that of the Poll Dorset lambs increased from 4 to 25% in 30 days. Coopworths were fed 60% effectively protected supplement and Poll Dorsets 80% protected. Tasting tests showed that meat containing elevated levels of linoleic acid had a bland, pork-like flavour and a sweet, lingering odour-note on cooking. Only at the highest levels of polyunsaturation (20%) did the meat have an oily taste; this was particularly apparent with the hot joint. AS

## 81

**[Possibilities for more objective sensory assessment of foods, taking into account corresponding chemical parameters.]** Möglichkeiten der Objektivierung bei der sensorischen Beurteilung von Lebensmitteln unter Berücksichtigung Korrespondierender Chemischer Parameter.

[Thesis]

Römer, G.

118 pp. (1974) [112 ref. De] Justus Liebig-Universität Giessen, Federal Republic of Germany

After discussing the theoretical bases of odour and taste perception, the author describes investigations into organoleptic and chemical changes occurring in dried baby foods (9 types of modified milk or milk gruel, all made by Milupa AG, Friedrichsdorf, German Federal Republic) that were stored under extreme conditions (-28°C; or alternation between 5°C at 90% RH and 40°C at 50% RH at 12-h intervals). The products were packaged in heat-sealed Al/paper/polyethylene laminate or polyethylene-coated sulphate paper sachets inside an outer carton. Under the extreme storage conditions, changes normally occurring after about 3 yr at room temp. could be observed after only 4 months. As part of the study, sensory test methods (particularly the 'tetradic' difference test, a further development of the triangular and duo-trio tests) were tried out and objectivized. The relationship between chemical characteristics and sensory findings was studied. Main conclusions included the following: product composition significantly affected storage properties but not organoleptic assessment; free amino acids and fatty acids decreased markedly during storage; there was no change in % triglyceride composition; increases or decreases in hydroxymethylfurfural content were associated with organoleptic quality changes; vitamin C content fell during storage, particularly in packaging permeable to oxygen and water vapour; and aroma substances formed during storage were long-chain aliphatic aldehydes. ADL

## 82

**Organoleptic assessment as a quality control and new product development medium.**

Parsons, W. A.

*South African Food Review* 2 (1) 49, 51, 53-54 (1975) [En]

Characteristics of the sense organs are described, and guidelines are given for the selection, non-selection and training of personnel to serve on the taste panel. [See also following abstr.] GL

## 83

**Organoleptic assessment: new product development depends on the tasters.**

Parsons, W. A.

*South African Food Review* 2 (2) 154, 157, 159, 161 (1975) [En]

A good taste panel member, after correct training, is able to consistently identify and accurately describe what he has learnt when he evaluates similar samples. The work environment,



the systems of assessment used by panelists and the presentation of samples are described. [See also preceding abstr.] GL

## 84

[New aspects of the sensory evaluation of wine quality.]

Malik, F.

*Vinohrad* 13 (1) 14-15 (1975) [5 ref. Sk]

[Chemickotech. Fak. SVST, Bratislava, Czechoslovakia]

Basic physiological preconditions for sensory evaluation, and their application in wine testing, are discussed. A hedonic scale for individual perception phenomena in wine evaluation is given along with a mathematical model of the sensory value, presented in the form of a sum of individual elements (sight, smell, taste, touch), multiplied by the preferential exponents for individual perceptions.

Quantification is then made of the exponents. The basic criterion of wine quality is considered to be the drinking rate, i.e. the consumption of a particular wine/head of population/yr in relation to its sensory value, alcohol content, and price. The sensory value is affected by the alcohol content, sugar, sugar-free extract, and volatile acids content. STI

## 85

PTC taste blindness and the taste of caffeine.

Hall, M. J.; Bartoshuk, L. M.; Cain, W. S.; Stevens, J. C.

*Nature, UK* 253 (5491) 442-443 (1975) [17 ref. En] [John B. Pierce Foundation Lab., Yale Univ., New Haven, Connecticut 06519, USA]

Taste thresholds for bitter substances, including PTC (phenylthiourea or phenylthiocarbamide) and caffeine, were tested by tasters and non-tasters of PTC. One implication of the results indicates that caffeine cannot add significant bitterness to the already bitter taste of coffee for the non-taster of PTC; concn. of caffeine in an average cup of brewed coffee, said to be 0.003-0.004M caffeine, is below or near the threshold of most PTC non-tasters but above that of most tasters. AL

## 86

Composition and flavour evaluation of a volatile fraction from cold-pressed Valencia orange oil.

Shaw, P. E.; Coleman, R. L.

*International Flavours and Food Additives* 6 (3) 190 (1975) [9 ref. En] [Citrus & Subtropical Products Lab., Winter Haven, Florida 33880, USA]

A method developed for concentrating volatile components of distilled citrus oils [FSTA (1971) 3 10J1261] was applied to cold-pressed orange oil and yielded a volatile fraction possessing an essence-like aroma. Its composition was studied and its contribution to orange juice flavour evaluated. 2 new orange oil components, 3-methyl-1-butene and isoprene were identified. This volatile oil

represented only 0.2% by wt. of the starting cold pressed oil. A taste panel presented with single strength orange juice could distinguish between juice flavoured with cold-pressed Valencia orange oil and juice flavoured with distillation fractions where the volatile fraction was omitted. When all 3 fractions were used in a ratio corresponding to proportions in oil, the panel could not distinguish juice flavoured with this reconstituted oil from that flavoured with cold-pressed orange oil. The volatile trace components in cold-pressed orange oil therefore influence its flavour. Possibly processing conditions should be changed to collect a volatile fraction separately to be used either to enhance folded oil aroma by blending back or to be used alone as a flavouring agent. Such process changes should result in more fresh-juice quality for folded orange oils. VJG

## 87

[Further development of the point-score method for sensory evaluation of foods.] Beitrag zur Weiterentwicklung der Punktbewertungsmethode zur sensorischen Analyse von Lebensmitteln.

Kochan, A.; Örsi, F.

*Lebensmittel-Industrie* 22 (4) 156-158 (1975) [8 ref. De, en, ru] [Tech. Univ., Dresden, German Democratic Republic]

A mathematical method for evaluation of the quality of foods on the basis of point scores awarded in organoleptic studies is described, with reference to studies on Parizsi cooked sausages. Correlation and discrimination analyses permit selection of characteristics of importance for product quality, selective weighing of these characteristics, and classification of the products into quality grades. IN

## 88

Symposium: flavor and culture. [Conference proceedings]

Pangborn, R. M. (Chairman)

*Food Technology* 29 (6) 34, 36, 38, 40, 42-44, 46, 48, 50-51 (1975) [22 ref. En] [Dept. of Food Sci. and Tech., Univ. of California, Davis, California 95616, USA]

Papers presented at this symposium were: Cross-cultural aspects of flavour preferences, by R. M. Pangborn (pp. 34, 36, 6 ref.); The importance of flavors in the Middle East by L. E. Grivetti (pp. 38, 40, 6 ref.); Rice, fish, and coconuts - the bases of Southeast Asian flavors, by C. S. Wilson (pp. 42-44, 5 ref.); and Flavor preferences and food patterns of selected U.S. and Caribbean blacks, by N. W. Jerome (pp. 46, 48, 50-51, 5 ref.). JA

## 89

Meanings of flavours and textures. II.

Jellinek, J. S.

*World Food Review* No. 2, 8-9 (1975) [En]

66 teenagers in Denver, Colorado were asked to rate 10 flavour words [See FSTA (1975) 7 6A288] by indicating appropriateness of each flavour to each eating time, eating situation, and people type



using a 7-point scale. They were asked to rate 8 snack foods on a set of 20 'semantic differential' scales, presented in tabular form. The scale ratings were then subjected to a factor analysis. The pattern suggested that the meanings associated with the various flavours and textures were in actuality related to the process of making food ready to be absorbed into the bloodstream. Attempts are made to show how the hypothesis that flavours and textures derive their meanings from their function as signals of the kind and degree of resistance to absorption which food exhibits and of the kind of activity which is required of the eater's organism to overcome this resistance. A table shows the physiological basis of the meanings of 14 food attributes. VJG

## 90

[Sensory analysis: a scientific tool?] [Review]  
Sauvageot, F.

*Cahiers de Nutrition et de Dietetique* 10 (1) 26-44 (1975) [62 ref. Fr] [Lab. de Biol.

Physicochimique, IBANA, Univ. de Dijon, France]

In this article the parallel between the sensory evaluation of foods by a taste panel and GLC analysis is discussed. Other aspects considered are: the sensitivity of detection of tastes and odours by panel members; the selection and training of a sensory evaluation panel; the preparation of the samples for analysis; suitable presentation to avoid 'bias'; and the interpretation of the results. MEG

## 91

[The perception of taste and flavouring substances in wine.]

Malik, F.

*Vinohrad* 13 (2) 43-44 (1975) [4 ref. Sk]

[Chemickotech. Fak. SVST, Bratislava, Czechoslovakia]

Physiological principles of taste perception and its mechanism, as related to the taster's profession, are discussed. The effect of temp. on the perception of individual taste components (sweetness, saltiness, sourness and bitterness) and the basic parameters affecting them are indicated. The sweet taste, due primarily to sugars, results from coordinated action of 2 different taste factors: glycophore (detector) and auxoglycie (enhancer); sourness, due primarily to the  $H^+$  is governed by the total content of acids (3.2-10.2 g/l. in Czechoslovak wines). Bitterness results from combined action of tannins, phloraphenes, some pigments and Mg salts; salinity is due to the action of inorganic salts. The wine taste is always a combination of the basic taste types. STI

## 92

[Determination of the sweetness of saccharin.]

Neuermittlung der Süßkraft von Saccharin.

Fricker, A.; Gutschmidt, J.; Prochazka, E.

*Deutsche Lebensmittel-Rundschau* 71 (4) 138-139 (1975) [6 ref. De, en, fr]

[Bundesforschungsanstalt für Ernährung, Karlsruhe, Federal Republic of Germany]

The taste threshold of saccharin was evaluated by the triangle test; saccharin concn. tested were

1.5-50 mg/l. The average taste threshold was approx. 4-5 mg/l. Studies on the sweetness of saccharin and sodium saccharin (relative to sucrose) were conducted, using reference samples of solutions containing 1-8% sucrose. The results agreed well with literature data, saccharin having a sweetening power  $\leq 700 \times$  that of sucrose, and sodium saccharin having a sweetening power  $\leq 550 \times$  that of sucrose. A clear effect of concn. on the sweetness of saccharin was observed, sweetening power (relative to sucrose) decreasing with increasing concn. Temp. in the range 5-60°C had no significant effect on sweetness. Saccharin in grapefruit juice (pH 3.05) tasted approx. 20% sweeter than the same concn. of saccharin in water. AJDW

## 93

[Evaluation of organoleptic scores by variance analysis - a way of grading evaluation systems.]

Varianzanalytische Auswertung von Ergebnissen der sensorischen Analyse - ein Weg zur Qualifizierung der Bewertungssysteme.

Kochan, A.; Lendvai, I.

*Elelmiszervizsgalati Közlemenyek* 20 (5/6) 319-326 (1974) [3 ref. De, hu, ru, en, fr] [Tech.

Univ., Dresden, Germany Democratic Republic]

Using green peas as an example, the systems of organoleptic evaluation by numerical scores currently in use in Hungary and the German Democratic Republic are described and compared. The results were processed by the Bartlett test, by calculation of the relative scatter and by bifactorial variance analysis. It was shown that by using both a system of scores developed uniformly for all relevant properties, and by adequate factors, it is possible to obtain homogeneous data for the same product, the results exhibiting a small scatter and the difference between the mean values for the individual properties also being small. IF

## 94

[Determination of food quality by organoleptic rating.]

Lasztity, R.; Örsi, F.

*Elelmiszervizsgalati Közlemenyek* 20 (5/6) 287-298 (1974) [7 ref. Hu, ru, de, en, fr] [Tech.

Univ. Budapest, Hungary]

Criteria for a scientifically-based organoleptic evaluation system include: correct choice of quality characteristics, a fixed score scale, and proper weighting of the quality characteristics. Detn. of the weighting factors is indispensable for developing a mathematical model for an evaluation based on numerical scores. Discriminance analysis proved successful for this purpose. The suitability of a method based on numerical scores and on discriminance analysis values for developing an accurate and reliable evaluation system was demonstrated by examples (evaluation of peach and sour cherry preserves, and canned green peas). IF



## 95

**Getting fullest value from sensory testing. I. Use and misuse of testing methods.**

Hirsh, N. L.

*Food Product Development* 8 (10) 33-34 (1974)  
[En] [Coca-Cola Co., Foods Div., Houston, Texas, USA]

Consideration is first given to the meaning and use of the different sensory test methodologies. Difference and preference testing are described and the meaning of the results obtained are explained. The relative merits of forced preference compared to likability ratings are considered. The validity for inference, of preference results obtained from company employee panels is discussed. VJG

## 96

**Getting fullest value from sensory testing. II. Considering the test objectives.**

Hirsh, N. L.

*Food Product Development* 9 (1) 10, 13 (1975)  
[En] [Coca-Cola Co., Foods Div., Houston, Texas, USA]

Consideration is given to the following aspects: meaning of the words 'significant' and 'meaningful'; methods for calculating 'correct' sample size for testing; possible misuse of the terms 'sensitivity' and 'precision'; and relationship between statistical significance and test sensitivity. Results of applying 4 tests for acceptance/preference to chocolate fudge pudding are tabulated. [See preceding abstr.] VJG

## 97

**Getting fullest value from sensory testing. III. Use and misuse of test panels.**

Hirsh, N. L.

*Food Product Development* 9 (2) 78, 80, 83 (1975) [En] [Coca-Cola Co., Foods Div., Houston, Texas, USA]

The 6 step testing sequence for developing a finished food is tabulated. Examples are used to illustrate the fact that bench-top prototypes should be prepared and served/tested in the same manner as they would be presented to the general employee panel, and that panels used to predict consumer preference or acceptability responses should be composed of persons similar to the potential consumers. Consideration is given to why sensory tests sometimes fail. [See preceding abstr.] VJG

## 98

**Can a sensory panel be replaced by an instrument.** [Lecture]

Sydow, E. von

*IFST Proceedings* 7 (3) 190-192 (1974) [5 ref. En] [Swedish Inst. for Food Preservation Res. (SIK), Gothenburg, Sweden]

Consumer assessment of a food involves different physiological senses which record e.g. appearance, aroma, taste, texture, viscosity, which are transmitted to the brain as an integrated sensory perception. Individual properties are usually measurable by chemical/instrumental

analysis; sensory panels are an attempt to express human response in systematic numerical terms. Examples are given of mathematical relations used between stimulus S (e.g. analytical measurement) and response R of a panel. Correlations between S and R can be such that S is purely accidental, or predictive or causative of R. A specific example is given of the unpleasant 'retort' or 'tinned' flavour of canned beef. Analyses (gas chromatography and MS) of changes during processing of various recipes at different temp. showed that the unpleasant aroma/flavour was associated with volatiles containing -SH groups and short-chain aliphatic aldehydes; 95 compounds were identified and 6 (named) were studied in detail. High R and S correlation coeff. are demonstrated for the 6 compounds or mixtures; it was further shown that volatiles decreased and odours improved with HTST processing (131°C) or aseptic canning. Instruments can usefully supplement a panel and sometimes replace it; in general both are essential and complementary in quality control. ELC

## 99

**Quality characteristics of broiled and roasted beef steaks.**

Batcher, O. M.; Deary, P. A.

*Journal of Food Science* 40 (4) 745-746 (1975)  
[12 ref. En] [USDA Consumer and Food Economics Inst., Beltsville, Maryland 20705, USA]

Quality characteristics of roasted and broiled beef steaks (semimembranosus muscle) cooked to internal temp. of 60° and 71°C were compared. Steaks required twice as much time but less than half the electrical energy to reach an internal temp. of 60° or 71°C when roasted in hot air than when broiled at the same temp. under direct heat. Yields of cooked meat and palatability scores were higher for roasted steaks than for broiled steaks. Panel members noted differences in palatability characteristics of steaks roasted to 60° and 71°C but did not observe such differences in steaks broiled to the same temp. Objective measures of press fluid and shear force verified panel evaluations of juiciness and tenderness. TS content of cooked steak was related to panel scores for mealiness and juiciness. IFT

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1	Application of Reverse Osmosis to Food Processing	□ £8.00	□ £3.00	□ £6.00
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FAB 15

TASTE PANELS IN FOOD SCIENCE

SELECTED FROM VOLUME 8

FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

under the direction of

Commonwealth Agricultural Bureaux, Farnham Royal, Bucks; Institut für Dokumentationswesen,  
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## INTRODUCTION

Food Annotated Bibliographies (FABs) are collections of abstracts on specific topics in food science and technology. The topics are chosen by the staff of the International Food Information Service as being of particular interest or importance. The topics normally interest individual workers, who may not require the full information provided in Food Science and Technology Abstracts, from which the abstracts for FABs are taken. The size and the cost of the FABs are controlled as much as possible with the interests of individual workers in mind.

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H. BROOKES

ASSISTANT EDITOR





## 1

**Symposium: chemical senses and nutrition.**  
[Conference proceedings]

United States of America, Institute of Food Technologists, Nutrition Division; United States of America, National Dairy Council

*Food Technology* 29 (8) 75-76, 78 (1975) [En]

Summaries are given of papers presented at this symposium held at the 35th Annual Meeting of the Institute of Food Technologists in Chicago on June 9-12, 1975. Papers were: Role of natural and synthetic sweeteners in human nutrition, by R. M. Pangborn & N. L. Larson (pp. 75-76, 3 ref.); Amino acids and taste, by H. S. Khurana (p. 76); Taste factors and obesity, by J. A. Grinker (pp. 76, 78, 8 ref.); and Changes in taste with age - infancy to senescence, by M. R. Kare (p. 78). JA

## 2

**[A taste survey of acceptance of frozen medical foods in diabetics.]**

Suzuki, K.

*Japanese Journal of Nutrition [Eiyogaku Zasshi]* 33 (1) 17-22 (1975) [2 ref. Ja, en] [Fourth Dept. of Internal Med., Jikei Univ. School of Med., Japan]

A taste survey on the use of frozen medical foods which have recently been put into practical use in Japan has been carried out with diabetic patients. 15 diabetics who are regular out-patients of the Jikei University School of Medicine tested 15 types of products, and gave their opinion on the future outlook for the products. Generally speaking the vegetable dishes were not favourable except Satsumajiru, while beancurd, rice and roux dishes all tasted comparatively good. As for fish and meat dishes, paste and ground types were preferred. Many patients were of the opinion that consumers can save their time in calorie calculation as it is clearly shown on the products and most patients favoured their occasional use in the future. AS

## 3

**Computer derived perceptual maps of flavors.**

Moskowitz, H. R.; Sydow, E. von

*Journal of Food Science* 40 (4) 788-792 (1975) [9 ref. En] [US Army Natick Lab., Natick, Massachusetts 01760, USA]

Profiles of the flavour of 4 juices (cranberry, blueberry, grape, apple) with different levels of added sucrose (in cranberry and blueberry juice) were obtained from panellists and analysed by multidimensional scaling. Panellists evaluated these juices using 22 aroma descriptors and 10 taste descriptors. Multidimensional scaling embedded both descriptor terms and juices into a 2-dimensional geometrical space, and simultaneously revealed relations among descriptors, among juices, and between descriptors and juices. An additional multidimensional scaling procedure, developed specifically to analyse individual differences (INDSCAL), revealed that, for evaluation of grape juice, panellists utilized 2 major 'dimensions', good-bad and relevant vs. irrelevant. Panellists agreed on

the use of good-bad descriptors, but differed in the way they conceptualized insistent vs. vague attributes. The same analysis revealed that panellists evaluated flavour of apple juice consistently across a 16-day period. The methods provide a new, powerful approach for understanding panellist's responses to perceptual characteristics of flavour. IFT

## 4

**[New methods for the evaluation and the analysis of organoleptic qualities of foodstuffs and for the forecast of their changes. VIII. Changes in the original flavouring substances during the heat treatment and storage of apple juice.]** Neue Methoden der Be- und Auswertung sensorischer Eigenschaften von Lebensmitteln und der Berechnung ihrer Veränderungen. VIII. Veränderungen ursprünglicher

Apfelsaftaromastoffe während der Erhitzung und Lagerung von Apfelsaft.

Herrmann, J.; Poeschel, W.

*Nahrung* 19 (5/6) 401-409 (1975) [28 ref. De, ep, ru] [Sektion Nahrungsgüterwirtschaft und Lebensmitteltech., Humboldt-Univ., Berlin (GDR)]

Gas chromatographic and sensory studies on changes in juice of Ontario and Gelber Köstlicher var. apples during holding for  $\leq 10$  h at 78°C or  $\leq 360$  h at 48°C are described. Graphs are given showing changes in the peak area of various volatile fractions during holding. The aroma components 'apple-aromatic' and 'grass-like' decreased with increasing duration of heat treatment; dilution studies and studies on blends of intensively heat-treated juice with mildly heat-treated juice showed that this apparent decrease was, in fact, due to masking of these aroma components by the newly-formed aroma component 'cooked aroma'. The furfural content of the juice increased with increasing intensity of heat treatment. Correlation coeff. of furfural content with 'cooked odour' 'apple-aromatic aroma' and 'fruity aroma' were, respectively, 0.781, -0.889 and -0.773. It is concluded that furfural concn. is a useful indicator of thermal deterioration of the organoleptic properties of apple juice. [See FSTA (1974) 6 3A117 for part VII.] AJDW

## 5

**The development of a vocabulary and profile assessment method for evaluating the flavour contribution of cider and perry aroma constituents.** Williams, A. A.

*Journal of the Science of Food and Agriculture* 26 (5) 567-582 (1975) [45 ref. En] [Cider & Fruit Juices Section, Long Ashton Res. Sta., Bristol BS18 9AF, UK]

Profile assessment of a cider or perry and correlation of the information with analytical data offer many advantages when evaluating the sensory significance of the large number of components detectable in such beverages by gas chromatography and other analytical techniques.



The application of this method together with the general need to be able to record and communicate information on the flavour of beverages makes the development of a meaningful language essential. All terms used in such a language must be universally understandable and accurately definable, preferably in terms of readily available standards. The progress in the development of such a vocabulary for assessing the aroma of ciders and the incorporation of the results into a profile assessment sheet are reported. AS

## 6

[Wine flavour and its perception by humans.]

Malik, F.

*Vinohrad* 13 (4) 88-89 (1975) [7 ref. Sk]

[Chemickotechnologická Fak. SVST, Bratislava, Czechoslovakia]

The principles of flavour perception are presented. The bouquet of wine is formed by primary components (the variety characteristics) and by secondary components, the latter being a reflection of the technological process and its stages (fermenting, resting (lagering) and overmature bouquet). The primary bouquet disappears during the technological processing, in particular during fermentation (loss of volatile matter with the CO<sub>2</sub>). The bouquet substances include carbonyl compounds, free and esterified carboxylic compounds, hydrocarbons and other substances. The content of carboxylic acid esters is particularly important; these considerably affect the softness and harmony of the flavour. Perception of the bouquet is governed by a spectrum of factors, such as suitability of the environment, concn. and temp. of the bouquet constituents. STI

## 7

Effect of processing on the comparative quality of Golden Delicious and Bramley's Seedling apples.

Gormley, T. R.

*Lebensmittel-Wissenschaft + Technologie* 8 (4)

168-171 (1975) [6 ref. En] [Agric. Inst., Kinsealy Res. Centre, Malahide Road, Dublin 5, Irish Republic]

Processed Golden Delicious apples (GD) were compared with processed samples of Bramley's Seedling apples (BS). Taste panels found no significant difference between slices of the 2 cultivars canned in syrup. Pies made with solid pack BS apples were significantly preferred to those made with solid pack GD apples. The GD samples lacked flavour and would not break down on cooking. Modification of the GD solid pack with a

2.5% malic acid solution before processing improved flavour and texture and taste panels found no significant difference between pies made from modified GD apples and those made from solid pack BS apples. Treatment with malic acid did not have the same flavour and texture enhancing effect on frozen GD slices as it had on the solid pack slices, and pies made with frozen BS apples were significantly preferred to those made with frozen, malic acid-treated GD apples. AS

## 8

Microbiological and sensory evaluation of a dehydrated turkey meat product.

Oblinger, J. L.; Draper, C. I.; Mendenhall, V. T. *Poultry Science* 54 (1) 91-95 (1975) [8 ref. En] [Inst. of Food & Agric. Sci., Univ. of Florida, Gainesville, Florida 32611, USA]

A dehydrated turkey meat product, "turkey jerky", was prepared and tested for acceptance using microbial and sensory methods. Jerky was prepared with and without the addition of sorbic acid and evaluated organoleptically and microbiologically during 5 and 7 months storage, respectively. Untreated samples of 18 and 30% moisture content were stored at both 5° and 25°C. Evaluation of untreated samples showed continuous microbial development in the 30% moisture product stored at 25°C. Sporadic recoveries of low levels of coagulase-positive staphylococci and streptococci were made. Sorbic acid-treated jerky samples were negative for food-borne pathogens and yielded low levels (<100/g) of organisms. Taste panel results indicated a preference for the 30% moisture product over the 18% moisture products when microbial growth in the 30% samples was controlled by refrigeration (5°C) and/or sorbic acid treatment (0.07%). AS

## 9

The effect of length of frozen storage on the palatability of lamb with elevated levels of polyunsaturated fat.

Purchas, R. W.; Barton, R. A.

*Food Technology in New Zealand* 10 (5) 7, 9 (1975) [4 ref. En] [Sheep Husbandry Dep., Massey Univ., Palmerston N, New Zealand]

15 lamb carcasses with about 17% linoleic acid in the leg fat were stored as cuts in O<sub>2</sub>-permeable film for 2 to 20 wk at -10°C to -13°C. The cuts were sampled at 1 month intervals for 6 months and sent to 15 taste panelists for palatability assessment using in-home tests. The terms used to describe 'acceptability', 'mutton flavour' and 'off-flavour' were allocated numerical values ranging from 1 to 5. The adjusted means for these characteristics were the calculated for each of the 3 cuts (shoulder and racks plus loins) at each storage time. No consistent patterns of change were apparent for any of the characteristics assessed. VJG





## 10

**Glossary of terms relating to sensory analysis of food.**

United Kingdom, British Standards Institution  
**British Standard BS 5098:1975** 12pp. ISBN 0-580-08424-8 (1975) [En]

This glossary is based on work undertaken by Working Group 2, Sensory Analysis of ISO/TC 34, Agricultural Food Products. The British Standard has been published with the intention of introducing subsequently any amendments which may prove necessary after completion of the international work. The glossary gives definitions of terms listed under 4 headings: Basic terminology; Terms relating to personnel; Terms relating to methods; and Terms relating to the senses. Terms of which the definitions have already been agreed within Working Group 2 are marked with an asterisk and the French equivalents are given. There are alphabetical indexes of the French and English terms listed. ADL

## 11

**[Identification of the four basic tastes. Studies at SIK, and comparison with results from studies at 2 test centres in Stockholm.]**

Johansson, B.; Nilsson, U.; Berggren, B.; Ljungqvist, A.-C.

**SIK Rapport** No. 348, 49pp. (1974) [10 ref. Sv, en]

## 12

**Selecting deformation rates in texture tests.**

Voisey, P. W.

**Journal of Texture Studies** 6 (2) 253-257 (1975) [15 ref. En] [Eng. Res. Service, Res. Branch, Agric. Canada, Ottawa, Ontario, K1A 0C6, Canada]

Since mastication involves high deformation rates ( $150 \text{ cm min}^{-1}$ ), the arbitrarily selected slow deformation rates usually used in instrumental texture tests can lead to erroneous results and lack of correlation with sensory evaluation with respect to the order of sample ranking. Sophisticated instrumentation that is costly to operate is required to accurately simulate the deformation rates operating in the mouth. It is suggested that instrumental data obtained at slow rates could be evaluated in a more meaningful manner if series of similar samples were tested at increasing deformation rates and the plotted force/deformation curves extrapolated to  $150 \text{ cm min}^{-1}$ . It is implied that recording systems would be more useful, if in addition to force, they sensed the rate of force change with deformation rate. AS

## 13

**Is rheology enough for food texture measurement?**

Bourne, M. C.

**Journal of Texture Studies** 6 (2) 259-262 (1975) [5 ref. En] [New York State Agric. Exp. Sta., Cornell Univ., Geneva, New York 14456, USA]

During mastication of food a number of processes occur, including deformation and flow (rheology), size reduction (comminution), and

mixing and hydration with saliva. Changes in temp. and surface roughness (rugosity) may also be important. Food researchers should realize that rheological tests describe only a portion of the physical properties sensed in the mouth during mastication. AS

## 14

**New product development.**

Hoggan, J.

**Technical Quarterly, Master Brewers Association of America** 12 (2) 81-86 (1975) [En, es] [Watney-Mann and Truman Brewery Ltd., London, UK]

This paper is concerned with the research procedure adopted in new product development work known as the Ideal Profile Technique. The technique shows where the test product ought to stand on any attribute in order to be completely acceptable to the consumer. In blind, paired comparisons, such as are used, where perhaps a new beer is being tested against an established beer, use of this technique will show how far both products diverge from or match up to the consumer's perceived ideal along each attribute. This will show, therefore, not only a direct comparison between the 2 products in the test along any given attribute but will also provide an 'inferred' preference between them. AS

## 15

**[Use of a combined sensory test for the numerical evaluation of the quality of roasted coffee.]**

Orsi, F.

**Élelmiszervizsgálati Közlemények** 21 (1/2) 25-28 (1975) [Hu, ru, de, en, fr] [Tech. Univ., Budapest, Hungary]

Liquid coffee prepared from 2 different samples of roasted coffee beans was offered to members of a panel as a ternary test. When the 2 coffee types had been distinguished, 4 characteristics of coffee (flavour, acidic taste effect, bitter taste effect and total sensation effect) were qualified by the panel, using 1-5 scores. The score-based evaluation combined with the ternary test produced data for checking the efficiency and evaluation capability of panel members or of member candidates, reduced the scatter of results by eliminating data of members giving incorrect scores and served as a basis for performing discriminant analysis. IF

## 16

**Practical ideas in flavor taste testing.**

Seigel, J. L.; McRae, J. P.; Valyi, Z.

**Proceedings, American Society of Brewing Chemists** 32 (2) 60-64 (1974) [17 ref. En] [Molson Breweries of Canada Ltd., Montreal, Quebec, Canada]

Sensory tasting panels are essential for quality control of brand marketed beers, but the choice of testing method is important. Thus preference tests (commonly used in marketing research) may use scores from trained panels to predict preferences from a large number of untrained persons, but even





with large numbers, involving a complex and expensive procedure, the results may not apply to the total population and false conclusions can be drawn. Difference (discrimination) tests are more commonly applied to beer, usually a form of triangular test in which a panellist is required to distinguish an odd sample from 2 similar ones in a group of 3, or a paired comparison test requiring indication of greater or lesser intensity of a characteristic between 2 samples. Statistical treatment is applied to the results. A ranking method used by the authors is described, in which a specified character (e.g. oxidation) is arranged in order with no control sample, or in relation to a given control. Examples are given of results obtained by expert and routine control panels for different beers made by different breweries and of various ages. Development of the flavour profile method as an ultimate procedure is also discussed; these results can be stored conveniently on computer cards. Using appropriate methods, differences between ales and lagers can be identified (including local variations in 'national' products), taste characteristics can be described completely, and changing trends detected. ELC

## 17

[Quality tests of orange juice in Baden-Württemberg. III. Results of sensory tests and chemical investigation of orange juices from the retail market of the Tübingen administrative district.] Qualitätsprüfung von Orangensäften in Baden-Württemberg. III. Ergebnisse der Sinnenprüfung und chemischen Untersuchung von Orangensäften aus dem Einzelhandel im Regierungsbezirk Tübingen. Benk, E.; Bergmann, R.

*Flüssiges Obst* 42 (1) 18, 23 (1975) [2 ref. De, en, fr] [Chem. Landesuntersuchungsanstalt, Sigmaringen, Federal Republic of Germany]

The results for sensory evaluation and exhaustive chemical investigation are set out in full for 17 samples. Water addition was suspected or established in 6 of the samples; 2 samples were found organoleptically objectionable and the description of 3 was considered misleading. [See FSTA (1975) 7 3H378 for part II.] SKK

## 18

Sensory profiling of beer.

Mecredy, J. M.; Sonnemann, J. C.; Lehmann, S. J. *Brewers' Digest* 50 (6) 42-46 (1975) [3 ref. En] [Consumer Product Res. Dep., Jos. Schlitz Brewing Co., Milwaukee, Wisconsin, USA]

Experiments were designed to describe quantitatively the flavour differences between beers. Initial tests were not sufficiently sensitive, so the quantitative descriptive analysis (QDA) method of the Stanford Research Institute was adopted, and modified [see Herbert (1974) IFT 34th Annual Meeting]. Characteristics evaluated with a selected trained panel were aroma, fruity, hoppy, sweet, diacetyl, tart, bitter, oxidized and malty taste, aftertaste, and flavour strength and S compounds. Data were plotted on polar co-ordinates to produce

a profile, superimposable on others for immediate comparison. Several profiles are illustrated, for American and imported beers. JRR

## 19

Profile sensory evaluation of chocolate. In '1st International Congress on Cocoa and Chocolate Research' [see FSTA (1976) 8 2K6]. [Lecture] Daget, N. pp. 319-328 (1974) [3 ref. En] [Nestle Products Tech. Assistance Co. Ltd., La Tour-de-Peilz, Switzerland]

The A. D. Little Inc. profile technique was adapted for the evaluation of cocoa and chocolate products. The principle of the method, establishment of questionnaires, tasting conditions, training of tasters and results obtained from 13 milk chocolates of various origins are described. The profile evaluation was easily applicable to chocolate products and gave reproducible results. It allowed classification of products based on organoleptic properties and could be used to control the effects of technological treatments. [See 8 2K6.] RM

## 20

[Relationships between structure and bitter taste of amino acids and peptides. I. Amino acids and related compounds.] Zusammenhänge zwischen Struktur und Bittergeschmack bei Aminosäuren und Peptiden. I. Aminosäuren und verwandte Verbindungen.

Wieser, H.; Belitz, H.-D.

*Zeitschrift für Lebensmittel-Untersuchung und -Forschung* 159 (2) 65-72 (1975) [16 ref. De, en] [Deutsche Forschungsanstalt für Lebensmittelchemie, Munich, Federal Republic of Germany]

About 60 amino acids, amino acid esters, N-acyl amino acids, amines, and other related compounds were examined for bitter taste. The thresholds were in the range 100 (L-2-amino butyric acid)-0.8 (benzamide)  $\mu\text{mol/ml}$ . Essential structural requirements for bitter compounds are a polar (electrophilic) group and a hydrophobic one, which must be arranged in a defined manner. The results are summarized in a model which shows the zone of contact between bitter compound and receptor.

AS

## 21

[Sensory testing and taste sensitivity.]

Kouwenhoven, T.

*Landbouwkundig Tijdschrift* 87 (11) 290-294 (1975) [6 ref. Nl] [Afdeling Humane Voeding, Landbouwhogeschool, Wageningen, Netherlands]

Sensory evaluation of foods is discussed, with reference to: the importance of taste and aroma for food preferences; applications of sensory testing; threshold values; the primary tastes; test methods; effects of training and experience; individual differences in taste sensitivity; and effects of environmental factors (illumination, RH, etc.) on test results. AJDW





## 22

**Towards a resolution of dual approaches in flavor analysis.**

Moskowitz, H. R.

*Lebensmittel-Wissenschaft + Technologie* 8 (5) 237-242 (1975) [20 ref. En] [Food Sci. Lab., US Army Natick Development Cent., Natick, Massachusetts 01760, USA]

2 major questions in flavour analysis (contributions of components to flavour, quality of flavour mixtures) are addressed from chemical and psychometric viewpoints. The 2 disciplines exhibit different strategies in pursuing the problems of flavour and odour mixtures, but these approaches are complementary. Quantitative models developed by psychologists can be used by chemists interested in describing the interrelations between mixtures and components, and by food technologists and fragrance engineers in developing target mixtures from different sets of pure starting chemicals. AS

## 23

**[An analysis of the terminology used in sensory evaluations of fish products.]**

Safronova, T. M.; Kirienko, G. P.; Kotlyar, I. A.; Li, E. V.; Tserchikova, L. Ya.

*Rybnoe Khozyaistvo* No. 5, 63-66 (1975) [Ru] [Dal'nevostochnyi Tekh. Inst. Rybnoi Promyshlennosti i Khozyaistva, USSR]

The results of a study on terminology used in sensory evaluation of the consistency, taste and flavour of fish are critically discussed, and scales for evaluation of these characteristics are proposed. STI

## 24

**Cooking frozen and thawed roasts.**

Fulton, L.; Davis, C.

*Journal of the American Dietetic Association* 67 (3) 227-231 (1975) [9 ref. En] [Consumer & Food Economics Inst., Agric. Res. Service, USDA, Beltsville, Maryland, USA]

Investigations were carried out to determine cooking times, yield, and palatability of braised and roasted beef, pork and lamb cooked from the frozen and thawed states. Cooking time for all roasts averaged from 3 to 22 min/lb longer for meat cooked from the frozen state. Mean % differences in cooking times for frozen roasts as compared with thawed roasts were greater in rib and loin sections of the 3 kinds of meat than in the boneless or less boney pieces. Except for beef rump roasts; % yield of cooked lean meat from the paired beef, pork and lamb roasts cooked from the frozen and thawed states did not differ significantly at the 5% level of probability when the individual cuts were analysed by the paired t-test. Collectively all pork roasts had a higher yield of cooked lean meat when cooked from the frozen state. State at the start of cooking did not effect juiciness and natural flavour of the roasts. Lamb leg and rib roasts were more tender when cooked from the thawed state. VJG

## 25

**[Some physiological and psychophysical observations on the taste sensitivity of test personnel.]**

Kouwenhoven, T.

*Mededelingen, Landbouwhogeschool, Wageningen* No. 74-13, 86pp. (1975) [many ref. Nl, en] [Alfdeling Humane Voeding, Landbouwhogeschool, Wageningen, Netherlands]

This paper attempts to integrate taste-testing experimental results from various areas of investigation, making them freely available. Sections are devoted to: principal motives for food intake and eating behaviour, and factors determining food choice; general and specific reasons for further taste research; a review of data pertaining to taste thresholds reported in the literature; detn. of principal taste quality thresholds; and the effects of coloured lighting on taste perception. The mean threshold values of 16 tasters were (mmol/l.), sucrose,  $9.1 \pm 4.7$ ; NaCl,  $7.8 \pm 5.4$ ; citric acid,  $0.23 \pm 0.22$ ; and quinine sulphate,  $0.00167 \pm 0.00085$ , representing sweet, salt, sour and bitter respectively. Training was significantly correlated with correct response rate, ( $P < 0.01$ ); colour effects (Na and Hg lighting) significantly increased sensitivity as compared with daylight-illuminated testing. [From En summ.] JRR

## 26

**Terminology in the sensory analysis of food.**

Harper, R.

*International Flavours and Food Additives* 6 (4) 215-216 (1975) [6 ref. En]

BSI 'Glossary of terms relating to the sensory analysis of food' (BS 5098: 1975) has recently been published. Consideration is given to its use in defining terminology in the food analysis field. The difficulty of obtaining international agreement on such a glossary is discussed. VJG

## 27

**Measuring panelists' consistency using composite complete-incomplete block designs.**

Cornell, J. A.; Schreckengost, J. F.

*Journal of Food Science* 40 (6) 1130-1133 (1975) [3 ref. En] [Dep. of Statistics, Univ. of Florida, Gainesville, Florida 32601, USA]

Composite complete-incomplete (C-I) block designs were introduced by Cornell & Knapp [see FSTA (1973) 5 4A231] for use in sensory testing. These composite C-I block designs are formed by combining complete blocks of  $t$  units each, where  $t$  is number of treatments to be compared, with balanced incomplete blocks of  $k$  units each ( $1 \leq k < t$ ) resulting in blocks of size  $t + k$  units. Efficiency of composite C-I block designs, when comparing fixed treatment effects, is higher than can be attained with complete block designs unless correlated is present between responses to treatments and their duplicates by each panelist. The presence of positive correlation between the 2 responses to the same treatment by a panelist, however, reflects a measure of efficiency of the panelist in that the closer in magnitude the responses to the same treatment are, the more





consistent the panelist is in evaluating that treatment. Furthermore, when correlation is present, an exact test of the hypothesis of equal treatment effects does not exist and an approximate test must be performed. The purpose of this paper is to consider a procedure for testing the presence of correlation as well as to propose a method for estimating the magnitude of the correlation, if present. An approximate test is described for treatments when correlation is present. IFT

## 28

### Consumer texture profile technique.

Szczesniak, A. S.; Loew, B. J.; Skinner, E. Z. *Journal of Food Science* **40** (6) 1253-1256 (1975) [4 ref. En] [General Foods Corp., Vent. Res. Tech. Cent., White Plains, New York 10625, USA]

A consumer texture profile technique was developed which provides a detailed quantitative description of a product in terms of its textural parameters. In addition, the technique lends itself to defining the textural characteristics of an ideal product; this unique type of information can be used as the target for product formulation and improvement work. The technique is based on a modification of the sensory texture profile method used with trained laboratory panels [see *Journal of Food Science* (1963) **28**, 404]. It is applicable to a number of consumer test situations. IFT

## 29

### [Experience with sensory testing.]

Órsi, F.

*Élelmezési Ipar* **29** (3) 79-83 (1975) [6 ref. Hu, ru, de, en] [Műszaki Egyetem, Budapest, Hungary]

Details are given of studies (using peach preserves and coffee) on the number of samples which can be sequentially evaluated by taste panellists without adverse effects on the accuracy of evaluation. It was found that the performance of the panellists was reduced after 6 samples had been tested; a rest period is required before further samples are evaluated. As an example, evaluation of fruit juices by alternating teams of panellists is described. IF

## 30

### Preferences for sweet and salty in 9- to 15-year-old and adult humans.

Desor, J. A.; Greene, L. S.; Maller, O.

*Science, USA* **190** (4215) 686-687 (1975) [11 ref. En] [Monell Chem. Senses Cent., Univ. of Pennsylvania, Philadelphia, Pennsylvania 19104, USA]

Preferences for the tastes of sucrose, lactose and NaCl were measured in 618 subjects aged 9-15 yr and in 140 adults. The younger subjects preferred greater sweetness and saltiness than did the adults. In the younger group, there were race and sex differences in preferences, none of which appeared among the adults. AS

## 31

### [Testing of water. Evaluation of taste.]

France, Association Francaise de Normalisation (AFNOR)

*French Standard NF T90-035*, 6pp. (1975) [Fr]

## 32

### Applications of sensory measurement to food evaluations. I. Threshold, category and discrimination scales. [Review]

Moskowitz, H. R.

*Lebensmittel-Wissenschaft + Technologie* **8** (6) 245-248 (1975) [10 ref. En] [Food Sci. Lab., US Army Natick Development Cent., Natick, Massachusetts 01760, USA]

## 33

### Applications of sensory measurement to food evaluations. II. Methods of ratio scaling. [Review]

Moskowitz, H. R.

*Lebensmittel-Wissenschaft + Technologie* **8** (6) 249-254 (1975) [25 ref. En] [Food Sci. Lab., US Army Natick Development Cent., Natick, Massachusetts 01760, USA]

## 34

### Psychometric classification of odors.

Yoshida, M.

*Chemical Senses and Flavor* **1** (4) 443-464 (1975) [20 ref. En] [Chuo Univ., Kasuga 1-13-27, Bunkyo-ku, Tokyo, Japan]

In order to find the relationship among standard odours proposed in various earlier studies, multivariate analyses were applied to the similarity judgment data among these odours. 20 male subjects judged the similarity among 32 standard test odours and 40 representative essential oils. The data were processed both by principal component analysis (PCA) and multidimensional scaling (MDS). According to PCA, standard test stimuli may be categorized into 3 groups. The first comprises cycloten, skatol, and diallyl sulphide, the second comprises exaltolide,  $\gamma$ -undecalactone, and phenol, while the third comprises  $\beta$ -phenylethylalcohol, camphor, acetic acid, and isovaleric acid. MDS yielded a slightly different classification. Referring to threshold values, physiological loads to subjects, and similarity judgment, an order of presentation in clinical diagnosis is recommended. AS

## 35

### [A study on the behavioural approach to taste.]

Japan, Research Group of Nutrition Guidance in Japan

*Japanese Journal of Nutrition [Eiyogaku Zasshi]* **33** (4) 169-193 (1975) [9 ref. Ja, en]

The behavioural approach to taste preferences was investigated in a questionnaire study of 1456 girl students (age 18-20) throughout Japan and 600 people in the Tokyo area. Horse mackerel prepared





in 6 ways was used as the test food. Results are related to environmental, psychological, physiological and other factors related to taste. [From En summ.] AL

### 36

#### Linear transfer spectra for olfactory magnitude estimation sequences.

Gregson, R. A. M.; Paddick, R. G. *Chemical Senses and Flavor* 1 (4) 403-410 (1975) [19 ref. En] [Univ., Canterbury, New Zealand]

The use of linear time series, as a psychophysical method of assessing self-adaptation and carryover effects in olfactory intensity judgments, is illustrated for eugenol and acetophenone. Data from series of 60 successive magnitude estimation judgments by 11 subjects show consistent within-subject and between-subject differences. The 2 substances used do not show the same self-adaptation patterns. AS

### 37

#### Cross-cultural differences in simple taste preferences.

Moskowitz, H. W.; Kumaraiah, V.; Sharma, K. N.; Jacobs, H. L.; Sharma, S. D. *Science, USA* 190 (4220) 1217-1218 (1975) [12 ref. En] [Food Sci. Lab., US Army Natick Lab., Natick, Massachusetts 01760, USA]

A population of Indian labourers who show high preferences for sour and bitter tastes has been studied. Their judgements of taste intensity and pleasantness of sweet and salty stimuli are in accord with European population estimates, which suggests that dietary history may alter preferences for simple taste stimuli without affecting the gustatory system. AS

### 38

#### [Use of statistical tests for evaluation of the results of sensory analysis.] Anwendung statistischer Tests zur Auswertung von Ergebnissen des sensorischen Analyse.

Kochan, A.; Örsi, F.; Molnar, P.; Neumann, R. *Lebensmittel-Industrie* 22 (11) 489-494 (1975) [8 ref. De, en, ru] [Tech. Univ., Dresden, German Democratic Republic]

The use of mathematical methods for evaluation of the results of sensory tests is discussed, using a series of studies on lactic butter as an example. Variance analyses were used to evaluate effects of the time of day at which the tests were conducted, to evaluate the comparability of results of different test panels, and the repeatability and reliability of the results of taste panel studies. IN

### 39

#### Rheological parameters related to meat tenderness.

Bashford, L. L.; Vavak, L. *Transactions of the ASAE* 18 (4) 755-756, 759 (1975) [7 ref. En] [Agric. Eng. Dep., Univ. of Nebraska, Lincoln, Nebraska, USA]

Taste panel evaluations of meat tenderness were compared with parameters derived from stress-relaxation and creep tests by axial compression and Warner-Bratzler tests, using samples of cooked beef from 12 choice and good grade beef cattle, and 6 canner and cutter grade cows. Warner-Bratzler shear tests correlated well with panel scores ( $r = 0.908$ ). Analysis of creep data failed to reveal any parameter indicative of taste panel score. Stress-relaxation tests indicated 2 parameters from a 3-element Maxwell model, the elastic term  $E$ , and the viscous term  $\eta$ , correlating with panel evaluations ( $r = 0.776$  and  $0.783$  respectively). Though less sensitive than Warner-Bratzler values, they show some promise as predictors. From observation and handling of the raw product, structural differences between the choice and the canner and cutter grades were apparent, especially with regard to axial movement along muscle bundles. RM

### 40

#### Objective-subjective assessment of meat tenderness.

Bouton, P. E.; Ford, A. L.; Harris, P. V.; Ratcliff, D. *Journal of Texture Studies* 6 (3) 315-328 (1975) [22 ref. En] [CSIRO Div. of Food Res., Meat Res. Lab., PO Box 12, Cannon Hill, Queensland, Australia]

Compression, shear, adhesion and cooking loss measurements were compared with sensory assessments of tenderness and juiciness. Multiple regression analyses of compression, shear and cooking loss accounted for 83.4% of the total variance in tenderness for samples presented to the panel as 1.5 cm cubes, and 73.2% for those presented as thin strips cut across the fibres. Cooking losses accounted for about 75% of the variance in juiciness scores. Regression equations indicated that higher cooking losses, and hence decreased juiciness, increased sensory toughness. The relative contribution of compression (connective tissue toughness) and shear (myofibrillar toughness) measurements varied considerably with sample treatment and fibre orientation of samples as presented to the panel. AS

### 41

#### Sensory evaluation: A link between food research and food acceptance research.

Frijters, J. E. R. *Lebensmittel-Wissenschaft + Technologie* 8 (6) 294-297 (1975) [1 ref. En] [Spelderholt Inst. for Poultry Res., Beekbergen, Netherlands]

The necessity for systematic sensory evaluation is stressed. Sensory evaluation is considered to be a form of psychological measurement and to be a link between food research and food acceptance research. It is pointed out that a valid approach to the study of the relationship between product and consumer should start with analysis of consumer acceptance behaviour in order to determine what weight the acceptance value of a food has. This analysis should also reveal which perceptual





dimensions contribute to this value. Through sensory analysis, perceptual dimensions must be made measurable by finding the relevant perceptual variables. These perceptual variables can be studied in relationship to physicochemical variables of the food and the preferential variables based on perceptual variables. The main advantage of this approach lies in the fact that those variables are studied which are related directly or indirectly to the ultimate criterion. In practice, however, sensory evaluation very often starts with study of the physicochemical variables in their relationship with perceptual variables and/or preferential variables without having investigated their relevance for the ultimate criterion: consumer food acceptance. AS

## 42

**Many sensory tests evaluate quality, but by different approaches.**

Vernon, P. F.

*Candy and Snack Industry* 140 (12) 42-45 (1975) [En] [Hershey Foods Corp., Hershey, Philadelphia, Pennsylvania, USA]

The differences between types of sensory tests, and their particular advantages and disadvantages are discussed. The three main types are: affective tests (ranking, hedonic); discrimination tests (triangle, duo-trio, paired comparison, rating or multiple comparison difference, threshold, dilution); and descriptive tests (descriptive analysis or flavour profile, and qualitative descriptive analysis tests). JRR

## 43

**[Fundamentals of the organoleptic evaluation of delicatessen-type foods.]** Grundlagen zur organoleptischen Beurteilung von Feinkostartikeln. Karow, H.

*Feinkostwirtschaft* 12 (10) 231, 234-235, 238 (1975) [De]

## 44

**Sensation and measurement.** [Book]

Moskowitz, H. R.; Scharf, B.; Stevens, J. C. (Editors)

xiii + 469pp. ISBN 90-277-0474-0 (1974) [many ref. En] Dordrecht, Netherlands; D. Reidel Publishing Co. Price \$39.50 [US Army Natick Lab., Natick, Massachusetts, USA]

The 40 papers in this volume were contributed as a memorial to S. S. Stevens, late professor of Psychophysics at Harvard University. They cover many disciplines, including psychology, physiology and physics. Papers of interest to food scientists include: Similarities of inhibition in the different sense organs [including taste and smell], by G. von Békésy (pp. 3-21, 14 ref.); On the sensory evaluation of compliant materials [e.g. cheese, dough], by R. Harper (pp. 91-98, 24 ref.); A power function for sensory receptors, by J. J. Zwislocki (pp. 185-197, 26 ref.), which includes mention of the response of the human chorda-tympani nerve to

citric acid, sucrose and NaCl; The effects of caffeine on terminal dark adaption, by A. L. Diamond & E. M. Smith (pp. 339-349, 33 ref.), which relates to the increasing sensitivity of human subjects to light following administration of caffeine compared with a non-caffeine placebo; and Models of additivity for sugar sweetness, by H. R. Moskowitz (pp. 379-388, 12 ref.), in which the sweetness was judged of 9 different sugars mixed at different concn. either with glucose or fructose, and power functions fitted to the sweetness of unmixed sugars were modified to give 2 predictors of mixture sweetness. AL

## 45

**Applications of sensory measurement to food evaluation. III. Multivariate and multidimensional scaling.** [Review]

Moskowitz, H. R.

*Lebensmittel-Wissenschaft + Technologie* 9 (1) 1-6 (1976) [19 ref. En] [Food Sci. Lab., US Army Natick Development Cent., Natick, Massachusetts 01760, USA]

See FSTA (1976) 8 5A241 for part II.

## 46

**[Comparison of selected methods for estimation of pasta colour.]**

Obuchowski, W.; Gasiorowski, H.; Klonowska, B. *Przemysł Spożywczy* 29 (11) 445-447 (1975) [7 ref. Pl, ru, fr, de] [Inst. Tech. Żywności Pochodzenia Roslinnego, AR, Poznań, Poland]

36 samples of commercial pasta (macaroni) of different origin and composition were ground in a laboratory mill so that approx. 70% of the particles were in the 180-430 µm range. The yellow and brown colour indices were measured at 480 and 550 nm as recommended by Alause & Feillet [FSTA (1972) 4 4M441] using (i) the Gardner Automatic Color Difference Meter, (ii) the Hunter colorimeter and (iii) the Spekolor colorimeter with the R 45/0 attachment. Measurements were on the ground pasta and on pats made from ground pasta and distilled water (2:1). The colour was also assessed organoleptically by an 8-member panel and indirectly by detn. of carotenoid content. The results and their statistical evaluation are tabulated and graphically presented. Variation coeff. ranged from 1.3 to 1.9 for (i), from 3.1 to 3.3 for (ii), from 8.3 to 8.8 for (iii); and were 1.1 for the carotenoid detn. and 17.5 for organoleptic assessment. It is considered that organoleptic assessment should be replaced by instrumental methods, (i) being considered the most suitable of those tested. SKK

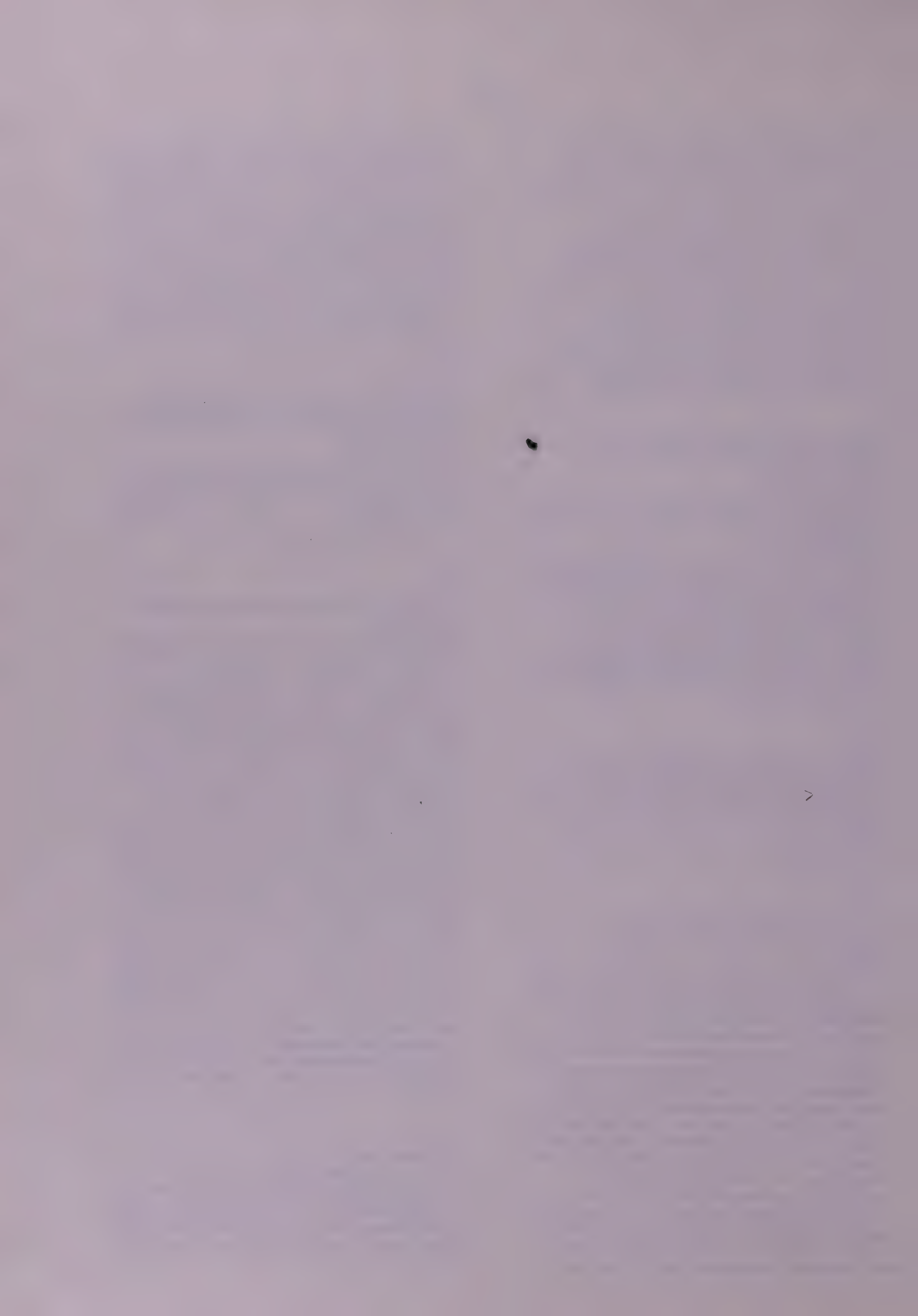
## 47

**The sweet taste.**

Kare, M. R.; Beauchamp, G.

*Abstracts of Papers, American Chemical Society* 171 (Centennial), CARB 56 (1976) [En] [Monell Chem. Senses Cent., Univ. of Pennsylvania, 3500 Market Street, Philadelphia, Pennsylvania 19104, USA]





Topics covered include: the mechanism and functions of taste; the nature of taste response to sweet stimuli in the newborn, the adolescent, and aged; and the significance of differences in response to various sweet stimuli amongst species. AS

## 48

[Sensory analysis of food.] Zarys analizy sensorycznej żywności. [Book]  
Barylko-Pikielna, N.

483pp. (1975) [Pl] Warsaw, Poland;  
Wydawnictwo Naukowo-techniczne Price 70zł

The book is intended for students of food technology and food technologists working in the field of quality control. It includes the following chapters: Problems in sensory analysis of food (pp. 11-17); Physiological and psychological principles of sensory analysis (pp. 18-53); Visual reception (pp. 54-75); Olfactory reception (pp. 76-119); Taste reception (pp. 120-177); Other senses participating in sensory evaluation (pp. 178-188); Factors affecting the results of sensory analysis (pp. 189-207); Conditions necessary for sensory analysis (pp. 208-240); Laboratory methods (pp. 241-295); Sensory methods of quality control (pp. 296-339); Methods of evaluation by consumers (pp. 340-356); Selected mathematical-statistical methods used in sensory analysis (pp. 357-421); Terms used in sensory analysis and their definitions (pp. 422-429); and Statistical tables (pp. 430-470). STI

## 49

**Progress towards an international system of beer flavor terminology.**

Clapperton, J. F.; Dalglish, C. E.; Meilgaard, M. C.

*Brygmesteren* 33 (1) 22-39 (1976) [21 ref. En] [Brewing Ind. Res. Foundation, Nutfield, Redhill, Surrey, UK]

In an attempt to bring order into the existing chaos of beer flavour terminology, working parties began by compiling a list of flavour terms in current use in the major languages. Terms were grouped according to related flavour characteristics. Synonyms and ill-defined terms were then eliminated and the most appropriate name selected for each separately identifiable flavour note. This paper summarizes the resultant flavour terminology, which attempts to arrange, in a logical way, terms describing sensory components of beer flavour which can be objectively characterized. It is recommended that the proposed terminology be used in the brewing industry for a trial period of  $\geq 1$  yr, and then reconsidered in the light of experience, so that an agreed definitive list of flavour terms, with detailed definitions and reference standards, may subsequently be prepared. Ongoing activities of the working parties on reference standards and on flavour thresholds are briefly discussed. AS

## 50

**[Progress toward an international system of beer flavour terminology.]**

Clapperton, J. F.; Dalglish, C. E.; Meilgaard, M. C.

*Bios* 6 (12) 448-455 (1975) [21 ref. Fr] [Brewing Ind. Res. Foundation, Nutfield, Redhill, Surrey, UK]

See preceding abstr.

## 51

**Progress towards an international system of beer flavour terminology.**

Clapperton, J. F.; Dalglish, C. E.; Meilgaard, M. C.

*Journal of the Institute of Brewing* 82 (1) 7-13 (1976) [21 ref. En] [Brewing Ind. Res. Foundation, Nutfield, Redhill, Surrey, UK]

See preceding abstr.

## 52

**[Progress towards an international system of beer flavour terminology.]**

Clapperton, J. F.; Dalglish, C. E.; Meilgaard, M. C.

*Brasserie Malterie Europe* 26 (1) 4-14 (1976) [21 ref. Fr] [Brewing Ind. Res. Foundation, Nutfield, Redhill, Surrey, UK]

See preceding abstr.

## 53

**[Interpretation of the results of official wine tasting.]**

Beitrag zur Auswertung der Ergebnisse der kommissionellen Weinverkostung.

Schneyder, J.

*Mitteilungen: Rebe, Wein, Obstbau und*

*Früchteverwertung* 25 (5/6) 411-422 (1975) [45 ref. De, en, fr] [Landw.-chem.

Bundesversuchsanstalt, 1020 Vienna, Austria]

A mathematical/statistic method is described for determining the validity of alleged defects in wine during tasting. Application of the method to routine tasting results at an official wine-tasting board indicated that it could be used to establish a voting validity system. HBr

## 54

**[Objective and subjective organoleptic evaluations, and graphical representation of results.]**

Curin, J.

*Kvasny Prumysl* 21 (7) 145-150 (1975) [8 ref. Cs, ru, en, de] [Pokusne a Vyvojove Stredisko GRPS, Prague, Czechoslovakia]

The objectivity of organoleptic evaluations of beer is discussed, together with their relationship with chemical and physical analyses. The necessity of exact differentiation between objective and subjective analyses is stressed. Detailed analysis is given of schemes for subjective and objective evaluation of beer and of methods of assessing results of objective analyses. The recommendation is made that results of organoleptic evaluations as well as of overall evaluations of beers be expressed graphically. This would give a simple and rapid visual appreciation of the quality criteria studied and hence simplify qualitative evaluation. Graphical illustrations are given of some results of different beer evaluation techniques. STI





## 55

**Weighting of quality characteristics in the sensory evaluation of foods by scoring.** [Lecture]  
Lasztity, R.; Örsi, F.

*Acta Alimentaria Academiae Scientiarum Hungaricae* 4 (4) 341-353 (1975) [9 ref. En]  
[Inst. of Biochem. & Food Tech., Tech. Univ. of Budapest, Muegyetem Rakpart 3-4, H-1527 Budapest, Hungary]

Some problems related to food evaluation by scoring and in particular to those of weighting were investigated. Bottled peaches, sour cherries and peas were evaluated by a sensory panel in accordance with standard specifications and the results were subjected to discriminant analysis (DA). Results of the standard method and the new scoring method based on DA for evaluation of bottled peaches, and results obtained by DA of sensory values of the 3 products in 3 subsequent seasons are given. DA may be advantageously applied to the weighting of quality characteristics accounting for several properties at the same time, and the lengthy calculations can be carried out quickly and accurately by computer. AL

## 56

**Sensory evaluation and its relationship to the chocolate and confectionery industry.**

Vernon, P. F.

*Manufacturing Confectioner* 55 (6) 42, 44, 46-47 (1975) [10 ref. En]

Affective, discriminative and descriptive test methods are described, with brief details of particular forms, as an aid to the technologist in selecting the most appropriate test. JRR

## 57

**[Evaluation of the taste and smell sensitivities of organoleptic test panellists.]** Zur Bestimmung des Geschmacks und Geruchs sensorischer Prüfer.

Szaboles, L.; Szabo, A.; Bende, E.

*Lebensmittel-Industrie* 22 (12) 543-544 (1975) [6 ref. De, en, ru] [Inst. für Lebensmittelkontrolle & Untersuchung, Győr, Hungary]

Brief details are given of a study on the taste sensitivity of 35 taste panellists; results were evaluated by probit analysis. Mean threshold values calculated for sour (citric acid), sweet (sucrose), salt (NaCl) and bitter (quinine sulphate) were 0.041%, 0.275%, 0.028% and 0.00022% respectively; threshold values for sweet, salt and bitter were lower than standard values used in Czechoslovakia and the German Democratic Republic. The aroma sensitivity of 28 panellists was also studied, using samples of NH<sub>3</sub>, acetic acid, ethanol, pepper, marjoram, cinnamon, caraway seed and cloves. No panellist failed to identify NH<sub>3</sub>, acetic acid or ethanol; several panellists made mistakes in identifying the herbs and spices. IN

## 58

**Communicating sensory objectives during prototype product development.**

Weiss, G.

*Food Product Development* 9 (7) 34, 36 (1975)  
[En] [LifeSavers Inc., Port Chester, New York, USA]

An example of a 2 × 2 factorial design system is presented. This system provides for the possibility of interaction between 2 variables, in this case, flavour level and sourness level, that could result in a nonlinear response and actually quantify the degree of the interaction. VJG

## 59

**[Texture determinations of foods. II. Sensory texture determination.]**

Costell, E.; Duran, L.

*Revista de Agroquímica y Tecnología de Alimentos* 15 (3) 301-314 (1975) [66 ref. Es] [Inst. de Agroquímica y Tecnología de Alimentos, Valencia, Spain]

The present state of knowledge on sensory texture perception, ways of describing texture quality and the main methods of evaluation are reviewed. These include panel tests, e.g. preference-acceptance, discrimination and descriptive evaluation, texture profiles, and a few non-oral tests (visual, tactile). RM

## 60

**Multidimensional scaling: a useful tool to measure flavor.**

Schiffman, S.

*Cereal Foods World* 21 (2) 64, 66, 68 (1976) [7 ref. En] [Dep. of Psychiatry, Duke Univ., Durham, N. Carolina, USA]

Multidimensional scaling is a mathematical tool enabling the production, from a set of relational data analogous to distances in geographical terms, of a 'map' displaying interrelationships as loci in 2 or 3 dimensions. The application of the technique to aroma and flavour investigation is discussed, and the results of some experiments are illustrated. JRR

## 61

**[Sensory/physiological fundamentals of organoleptic perception.]** Sinnesphysiologische Grundlagen der Sensorik.

Fricker, A.

*Kaffee und Tee Markt* 26 (5) 3-5 (1976) [5 ref. De] [Inst. für Chemie & Tech., Bundesforschungsanstalt für Ernährung, Karlsruhe, Federal Republic of Germany]





62

[Sensory and chemical changes in dried foods under the influence of extreme storage conditions. I. Method of sensory evaluation.]

Sensorische und chemische Veränderungen getrockneter Nahrungsmittel unter dem Einfluss extremer Lagerungsbedingungen. I. Zur Methodik der sensorischen Qualitätsbeurteilung.

Römer, G.; Renner, E.

*Zeitschrift für Lebensmittel-Untersuchung und -Forschung* 160 (2) 149-154 (1976) [20 ref. De, en] [Milchwirtschaftliche Abteilung, Justus-Liebig-Univ., Giessen, Federal Republic of Germany]

The method is based on the 5-point scale adopted in 1971 by the German Agricultural Association (DLG) [see FSTA (1970) 2 4P476] modified to enable statistical evaluation. The procedure is described in detail. The dried products used in part II of the study [see following abstr.] were the following commercial milk formulae or foods for infants: milk,  $\frac{1}{3}$  milk, same with honey,  $\frac{1}{3}$  milk puree with fruit,  $\frac{1}{3}$  milk puree with rusk, whole milk puree with chocolate,  $\frac{1}{3}$  milk/groats puree, and  $\frac{1}{3}$  milk puree with orange. The products packaged in 300-g bags of Al/paper/polyethylene laminate or polyethylene/paper laminate were stored at -28°C, or under conditions alternating every 12 h between 5°C at 90% RH and 40°C at 50% RH. Values for contents of protein, fat, carbohydrate and ash in the products are tabulated. SKK

63

Progress towards an international system of beer flavor terminology.

Clapperton, J. F.; Dalgliesh, C. E.; Meilgaard, M. C.

*Technical Quarterly, Master Brewers Association of America* 12 (4) 273-280 (1975) [21 ref. En, es] [Brewing Ind. Res. Foundation, Nutfield, Redhill, Surrey, UK]

See FSTA (1976) 8 8H1323.

64

Gel chromatographic fractionation of flavour components for their individual sensory evaluation.

Noble, A. C.

*Journal of Agricultural and Food Chemistry* 24 (2) 321-323 (1976) [13 ref. En] [Dep. of Viticulture & Enology, Univ. of California, Davis, California 95616; USA]

Components of 2 tomato juices which had significantly different flavours were separated by gel chromatography on Sephadex G-15 of sera prepared by centrifugation of the juice. The eluate was monitored by UV absorbance, tests for reducing sugars, and by sensory evaluation. In sensory evaluation of the isolated fractions, 12-15 flavour notes were reported. Minor differences between the flavour notes detected in unconc. tomato juice vs. those in a reconstituted tomato juice were found. Preliminary gas chromatography

of hexane extracts of sensorially significant gel chromatographic fractions showed  $\leq 5$  components present in each fraction. AS

65

[Comparative sweetness of different sugars.]

Morton, L.

*Industria delle Bevande* 5 (1) 86-90 (1976) [7 ref. It]

As the sweetness of various sugars relative to sucrose (taken as 100) is not a constant figure but varies with concn., temp. and acidity, sweetness values were studied in relation to the use of dextrose and levulose in soft drinks. A syrup base was used containing sucrose (10° Brix) and 1.84 ml phosphoric acid (75%)/l. syrup; 28 g syrup base were added to 155 g aerated water to yield 3.6 vol. gas content. Comparisons (at 1.7°C) were made with other substituted sugars by a taste panel and the points of equal subjective reaction determined; relative sweetness was calculated from the ratio between solids in the sucrose control and experimental solutions at this point. Results are presented graphically for dextrose, levulose, invert sugar, and 4 mixtures of sucrose, dextrose and levulose. Dextrose and levulose alone gave lower sweetness values than normally quoted, e.g. dextrose 50 vs. 70 and levulose 105 vs. 173. The mixture containing sucrose gave higher sweetness values than expected from calculation, attributed to a pronounced synergistic effect between sucrose and the other sugars. Acidity and gas content did not affect the results. ELC

66

[The justifiability of various point systems for organoleptic evaluation of meat and meat products.] [Lecture]

Ioksimovich, Ya. [Joksimovic, J.]

*Proceedings of the European Meeting of Meat Research Workers* 19 (Part II) 547-569 (1973) [21 ref. Ru, en, de, fr]

The relative merits of various scales for organoleptic evaluation of meat products were studied with special reference to comparison of 5-point and 10-point scales. Correlation analyses showed 5-point scales to be superior. A new unified procedure for evaluation of sausages is described. [See FSTA (1976) 8 9S1589.] AJDW

67

Use of linear rating scales for the evaluation of beer flavor by consumers.

Einstein, M. A.

*Journal of Food Science* 41 (2) 383-385 (1976) [3 ref. En] [Rainier Brewing Co., Seattle, Washington 98124, USA]

In this study, beer flavour attributes as well as preference were measured using linear rating scales. Each scale was undefined except for a descriptive term which anchored either end (e.g. Bitter....Not Bitter). This technique was used to





determine if consumers could discriminate between 3 beers: 2 'light' and a third 'Not-So-Light' beer brewed with more malt and hops and considered to be 'more flavourful' than the others. Coded beers were presented to 200 untrained beer drinkers half of whom claimed to prefer 'more flavourful' beer. The Not-So-Light beer was found to have greater flavour intensity, body, bitterness and aftertaste than the light beers. Those who prior to testing stated they preferred more flavourful beer were capable of detecting the flavour difference and among the 3 beers, preferred the Not-So-Light. IFT

## 68

[Correlation between sensory evaluation and sake components.]

Okazaki, N.; Ito, K.; Iimura, Y.; Takahashi, T.; Nakamura, T.; Tsuji, T.; Takenaka, S.; Miyano, N.; Shinagawa, H.

*Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi]* 70 (9) 662-665 (1975) [4 ref. Ja] [Tech. Cent., Nagoya Tax Administration Bureau, Nagoya, Japan]

Correlation between sensory evaluation of sake (overall quality, fullness of body, 'cleanness') and chemical analysis (18 standard analysis) was determined, using regression models. Fullness correlated with sp. gr., buffering capacity and Na ( $r = 0.527$ ); 'cleanness' correlated with buffering capacity, sp. gr. and phenolic compounds ( $r = 0.751$ ); and overall quality correlated with phenolic compounds, buffering capacity and sp. gr. ( $r = 0.676$ ), as well as with fullness, 'cleanness' and 'over-matured' aroma ( $r = 0.921$ ). YN

## 69

Rheological properties related to bread freshness.

Bashford, L. L.; Hartung, T. E.

*Journal of Food Science* 41 (2) 446-447 (1976) [5 ref. En] [Dep. of Agric. Eng., Inst. of Agric. & Natural Resources, Univ. of Nebraska, Lincoln, Nebraska 68503, USA]

Correlation of taste panel evaluations of bread freshness with parameters derived from standard rheological tests was explored. Results support the possibility that a rheological test could be standardized to be a valid predictor of bread freshness. IFT

## 70

Sensory testing of pen-reared salmon and trout.

Ostrander, J.; Martinsen, C.; Liston, J.; McCullough, J.

*Journal of Food Science* 41 (2) 386-390 (1976) [14 ref. En] [School of Home Economics, Univ. of Washington, Seattle, Washington 98195, USA]

Pen-reared, pan-sized salmon and trout available locally were evaluated by a trained panel and a consumer panel. The trained panel determined differences of baked samples on odour, texture, moistness and flavour and visual differences for flesh colour, fibre structure, and brownness along the lateral line. Highly significant differences were

detected among samples for texture, flavour, colour, and fibre structure. Consumer evaluation of 2 salmon samples and a trout sample indicated no significant differences in preference among the 3 samples. However, the results suggest that aquaculturists must pay more attention to the organoleptically desirable features of the fish they raise. IFT

## 71

Comparison of methods of freshness assessment of wet fish. IV. Assessment of commercial fish at port markets.

Connell, J. J.; Howgate, P. F.; Mackie, I. M.; Sanders, H. R.; Smith, G. L.

*Journal of Food Technology* 11 (3) 297-308 (1976) [11 ref. En] [Torry Res. Sta., 135 Abbey Road, Aberdeen AB9 8DG, UK]

2 sensory methods (General appearance and Raw odour) and 2 instrumental methods (Torry Fish Freshness Meter and Intelectron Fish Tester V) were tested on Aberdeen and Hull markets. The variability of each method, comparisons between the methods and the time required to carry them out under market conditions were obtained. The instrumental methods (particularly the averaging version of the Torry instrument) are most economical to operate. [See preceding abstr. for part III.] AS

## 72

Palatability and other characteristics of repeatedly refrozen chicken broilers.

Baker, R. C.; Darfler, J. M.; Mulnix, E. J.; Nath, K. R.

*Journal of Food Science* 41 (2) 443-445 (1976) [9 ref. En] [Dep. of Poultry Sci., Cornell Univ., Ithaca, New York 14853, USA]

To determine the effect of refreezing on broiler carcasses, 3 separate lots of commercially processed chickens were packaged in polyethylene bags and frozen at  $-18^{\circ}$  or  $-30^{\circ}\text{C}$ . At 2-4 day intervals they were thawed at room temp. for 7-8 h (to  $4^{\circ}\text{C}$  internal). Random carcasses were removed for testing and the remainder refrozen,  $\leq 5$  times. Tests included taste panelling and visual observations for sliminess and bone discoloration, total moisture, thiobarbituric acid (TBA) values, shear values and total viable counts. Total drip and total losses were also calculated. Results showed that taste panel scores for tenderness, juiciness, flavour and overall acceptability of roasted breast meat were not affected by 5 refreezings. Visual observations showed no appreciable increase in sliminess or bone discoloration due to repeated refreezings. Total drip increased but total loss (which included cooking losses) changed little after the first refreezing. Total moisture in the cooked product and shear values for dark meat showed no change, while shear values for light meat decreased. TBA values did not increase over those for the control until after 4 refreezings. It appears, from the results of this study, that poultry can be safely refrozen several times, providing the meat is handled properly. IFT





## 73

**[Sensory analysis of texture/consistency in patties containing textured soy protein.]**

Andersson, Y.; Lundgren, B.

**SIK Rapport** No. 370, 47pp. (1975) [9 ref. Sv, en] [Swedish Inst. for Food Preservation Res. (SIK) Fack, S-400 21 Göteborg 16, Sweden]

Patties (steakburger type) were prepared wholly from meat, and by replacing part of the meat with 4, 8 or 12% dry textured soy protein ('Dipro F' containing 70% protein), with additions of water and fat required to rehydrate the protein and restore the fat content of 100% meat. Patties stored at -20°C were tested for texture/consistency at 0, 3 and 6 months using paired comparisons by biting for hardness, elasticity, chewiness and juiciness, plus finger pressure for hardness and elasticity. Detailed statistical analyses are presented. Verbal definitions used for hardness and chewiness proved adequate for quantitative description, but only partly adequate for juiciness; the elasticity definition failed to rank the samples. Storage for 6 months at -20°C had no significant effect on texture or consistency of any of the patties. Ranking orders according to % Dipro F (biting tests) were: hardness, 12% < 0% < 8% < 4%; chewiness, 12% < 8% < 4% < 0%; juiciness, 12% < 8 or 4% < 0%. ELC

## 74

**Emulsion product acceptability as affected by levels of boar pork and levels of fennel spice. [Lecture]**

Plimpton, R. F., Jr.; Ockerman, H. W.; Greene, D. M.

**Proceedings of the European Meeting of Meat Research Workers** No. 20, 130-132 (1975) [10 ref. En, fr, de, ru] [Ohio State Univ., Columbus, Ohio 43210, USA]

Samples of Bologna sausage were manufactured containing 0, 25, 50, 75 or 100% boar pork and 0, 0.075 or 0.15% fennel. The products were tested for 'boar odour' by a taste panel and by the hot iron and hot water methods; flavour, colour and texture were also evaluated by the taste panel. Tables of results are given. The results show that 'boar odour' intensity of Bologna sausages tended to increase with increasing % boar meat and to decrease with increasing % fennel; it is suggested that a product containing ≤50% boar meat together with 0.15% fennel would be acceptable to most consumers. Trained taste panels gave the best detection of boar meat and discrimination between products containing different concn. of boar meat. The hot iron method was useful for distinguishing boar meat from barrow meat, but could not adequately detect graded differences in boar meat content of mixtures. The hot water method could not reliably distinguish between boar meat and barrow meat. [See FSTA (1976) 8 10S1831.] AJDW

## 75

**Ratio scaling: refined tool for evaluation of acceptability, preference in product testing.**

Moskowitz, H. R.; Toscano, V.

**Candy and Snack Industry** 141 (5) 28-33 (1976) [En]

The magnitude estimation, or ratio scaling, technique of employing taste panel discriminators is described. The panellist assigns a numerical value to the parameter under consideration, e.g. sweetness, in direct ratio to a previously assigned standard with a set parameter magnitude. It is claimed that the method allows straight forward analysis of the raw data, and that results are improved due to the panellist's ability to generate and use a personal scale. JRR

## 76

**[Aroma problems in food and nutrition. III. Sensory methods.]** Aromaprobleme in Nahrung und Ernährung. III. Methoden der Sensorik. Schrödter, R.; Rödel, W.**Ernährungsforschung** 20 (5) 136-141 (1975) [7 ref. De] [Zentralinst. für Ernährung, Potsdam-Rehbrücke, German Democratic Republic]

Sensory evaluation of foods is discussed, with reference to: selection and training of panellists; size of the taste panel; the design of rooms to be used for sensory tests; sample preparation; sample presentation; evaluation of results; and sensory test procedures. [See also following abstr.] IN

## 77

**[Thoughts on discrimination ability of panel members in connection with the tetrad test of Renner & Römer.]** Gedanken zum Qualifikationsmassstab (BQ) für Prüfpersonen anhand des Tetrudentestes nach Renner und Römer.Miller, M.; Schmidt, H.; Wildbrett, G. **Zeitschrift für Lebensmittel-Untersuchung und -Forschung** 161 (2) 151-156 (1976) [7 ref. De, en] [Milchwissenschaftliches Inst., Tech. Univ. München, D-8050 Weihenstephan, Federal Republic of Germany]

The suitability of the Renner & Römer tetrad test [see FSTA (1973) 5 8A394 & (1974) 6 2A52] for evaluation of the performance of panel members was examined in the course of an experiment on sensory assessment of the degree of permeability of different packaging materials for liquid milk to extraneous odours, sauerkraut, onion, and fresh and smoked fish being used as separate odour sources. It is concluded that the tetrad test cannot serve as criterion of discrimination ability, but merely establishes the rank order of a panel member within the panel with regard to a specific set of conditions; and that the test is no substitute for selection of panel members for a given task. SKK

## 78

**[Examination of test panel members by the tetrad test. Comments on the paper by Miller, Schmidt & Wildbrett.]** Zur Beurteilung von Prüfpersonen anhand des Tetraden-Tests. Kurze Stellungnahme zum Beitrag von Miller, Schmidt und Wildbrett.





Renner, E.

*Zeitschrift für Lebensmittel-Untersuchung und -Forschung* 161 (3) 277-278 (1976) [De, en]  
[Milchwirtschaftliche Abteilung, Justus Liebig-  
Univ., Bismarckstrasse 16, D-6300 Giessen,  
Federal Republic of Germany]

With reference to the application of the tetradic test for evaluating members of taste testing panels, some principles are mentioned and some interpretations given. [See preceding abstr. for paper by Miller et al.] AS

## 79

**A method for the statistical selection of a panel of rum tasters.**

Torres, C. S.; Aguiar, J. L.; Gotay, E. F.  
*Journal of Agriculture of the University of Puerto Rico* 60 (1) 105-112 (1976) [9 ref. En, es]  
[Agric. Exp. Sta., Mayagüez Campus, Univ. of Puerto Rico, Rio Piedras, Puerto Rico]

Prospective tasters completed questionnaires on age, country of origin, occupation, drinking and smoking habits and health status. Demonstrations were given on the appraisal of body and flavour of rum. A comparison method of evaluation was used in which testers were presented first with a reference sample then with 3 other rums. Tasters evaluated each sample 4 times in a different order following the reference sample. A set of 14 rum attributes and general preference items were considered. Analysis of variance of Latin squares was made for each taster and rum attribute and a rum evaluation index calculated for each taster. Results are presented in detail. It was concluded that: (i) rum drinking frequency is not a requisite for a good rum taster, (ii) scientists showed greater ability than non-scientists in evaluating rum and (iii) in general younger people had better rum judging abilities. CRI

## 80

**[Dry, semi-dry, mild and sweet - results of a wine tasting study.]** "Trocken - Halbtrocken - Mild - Lieblich" Ergebnisse einer Testweinprobe.

Zürn, F.; Perscheid, M.

*Weinwirtschaft* 112 (18) 442-444 (1976) [De]  
[Inst. für Kellerwirtschaft und Verfahrenstech., Forschungsanstalt, Geisenheim, Federal Republic of Germany]

Samples of 6 Rheingau wines (4 Rieslings, 1 Müller-Thurgau and 1 Gewürztraminer) were used in a study on effects of sugar content (4, 8, 12, 16, 24, 32 or 48 g/l., adjusted with sucrose) on classification of the wines as 'dry', semi-dry, 'mild' and 'sweet' by a taste panel. Diagrams of results are given. Overall, wines with residual sugar concn. <12 g/l. were classified as 'dry'; limiting values for the other groups were: 'semi-dry' 12-24 g/l.; 'mild' 24-32 g/l.; and 'sweet' >32 g/l. Acid content was not clearly related to the dryness/sweetness of the wines. TUB-IGB

## 81

**Human responses to environmental odors.** [Book]  
Turk, A.; Johnston, J. W., Jr.; Moulton, D. G.  
(Editors)

xii + 345pp. ISBN 0-12-703860-4 (1974) [many ref. En] New York, USA; Academic Press, Inc.  
Price \$21.50 [Dep. of Chem., City Coll., City Univ. of New York, New York, USA]

This book presents an in-depth assessment of individual and community responses to odours. It should be of interest to zoologists, anatomists, electrophysiologists, comparative and human psychologists, organic chemists, perfumers, flavour scientists, and pharmacologists. Chapters include: Psychophysical scaling of odour, by W. S. Cain & H. R. Moskowitz (pp. 1-32, many ref.); Laser Raman spectroscopy, by I. W. Levin (pp. 46-120, many ref.); Method and theory in the study of odour preferences, by T. Engen (pp. 121-141, 25 ref.); Sensory evaluation of odour intensity at the source and in the ambient air, by T. Lindvall (pp. 143-162, 74 ref.); Transport and dispersal of odours, by U. Högström (pp. 164-198, 13 ref.); Vapour pressures and Raoult's law deviations in relation to odour enhancement and suppression, by H. G. Haring (pp. 199-226, 8 ref.); Sampling in airborne odorant analysis, by C. Weurman (pp. 263-328, many ref.); Annoyance reactions to environmental odours, by E. Jonsson (pp. 330-333, 8 ref.); and The stability of emitted odorous compounds in the atmosphere, by G. Andersson, C. Brosset & P. Grennfelt (pp. 335-342, 27 ref.). VJG

## 82

**Aroma research. Proceedings of the International Symposium on Aroma Research held at the Central Institute for Nutrition and Food Research TNO, Zeist, the Netherlands, May 26-29, 1975.**

[Conference proceedings]

Maarse, H.; Groenen, P. J. (Netherlands.  
Organization for Nutrition & Food Research TNO;  
Netherlands. Central Institute for Nutrition & Food Research TNO) (Editors)

245pp. ISBN 90-220-0573-0 (1975) [many ref. En] Wageningen, Netherlands: Centre for Agricultural Publishing & Documentation Price f55

[Continued from preceding abstr.] Organic sulphur compounds as flavour constituents: reaction product of carbonyl compounds, hydrogen sulphide and ammonia, by H. Boelens, L. M. van der Linde, P. J. de Valois, J. M. van Dort & H. J. Takken (pp. 95-100, 15 ref.), which reports on studies by gas chromatography and MS of reaction products from model systems; The human instrument in sensory analysis, by E. P. Köster (pp. 103-110); Aroma values - a useful concept?, by M. Rothe (pp. 111-119, 12 ref.); Use of odour thresholds in sensorial testing and comparisons with instrumental analysis, by P. Salo (pp. 121-130, 15 ref.), which reviews studies on whisky; Techniques for assessing odour: uses and limitations, by D. G. Land (pp. 131-138, 22 ref.), the techniques discussed being semantic differential, free description, flavour profile and directed description with rating; Thiamine,





thiamine diphosphate and 'aroma values', by J. Solms (pp. 139-140, 3 ref.) [see FSTA (1976) 8 3G177 & 3G178]; Binding of volatile aroma substances to nutrients and foodstuffs, by H. G. Maier (pp. 143-157, 5 ref.), which discusses binding of the substances by amino acids, triglycerides, proteins, carbohydrates, and dry foodstuffs (milk powder, potato flakes, coffee extract, strawberry powder); Method for encapsulation of polar compounds in foods, by H. G. Peer & B. Hoogstad (pp. 159-166, 11 ref.), which discusses preparation of the capsules, their physical structure, measurement of their flavour retention and potential uses, e.g. in soup; [continued in following abstr.] JA

## 83

[Organoleptic analysis of foods of animal origin (milk and dairy products).] Organoleptická analyza potravín živočíšneho pôvodu. [Book] Cigánková, V.; Štefunka, F. 99pp. (1974) [Cs] Bratislava, Czechoslovakia; Vysoká škola Veterinárská v Košiciach Vydavateľstvo Príroda Price 6Kcs

The publication is intended as a textbook for students of veterinary schools and those working in the fields of food technology. It includes the following chapters: The role and importance of organoleptic analysis (pp. 4-5); Methods for examination of foods (pp. 6-11); Basic knowledge on physiology of sensory organs (pp. 12-35); and Methods of organoleptic evaluation of milk and dairy products (pp. 51-99). STI

## 84

The relation between boar odor intensity and 5 $\alpha$ -androst-16-en-3-one content in pork fat. Thompson, R. H., Jr.

*Dissertation Abstracts International*, B 36 (9) 4372: Order No. 76-5658 (1976) [En] [Michigan State Univ., East Lansing, Michigan 48824, USA]

A study was made of the relationship between boar odour scores for fat samples derived from cryptorchid pigs and the levels of 5 $\alpha$ -androst-16-en-3-one (AEO). Levels of AEO in 21 fat samples were assessed by a stable isotope dilution/carrier technique using deuterium-labelled AEO. Intensity of boar odour was assessed by taste panels and the values were correlated with the levels of AEO determined by isotope dilution. Correlation coeff. for a meat industry panel and AEO levels was 0.40, which was not statistically significant ( $P < 0.05$ ); the corresponding correlation coeff. for a trained laboratory panel was 0.51, which was significant at  $P < 0.05$ . The correlation coeff. between the odour scores for the 2 panels was 0.52 ( $P < 0.05$ ). Although the trained laboratory panel was apparently able to detect the level of AEO, the relationship accounted for only 25% of the variation. This indicated that AEO is not solely responsible for the undesirable boar odour and that other related C<sub>19</sub>-<sup>6</sup> steroids may be involved. JA

## 85

[Sensory analysis. Terms and definitions.] Spain, Instituto Nacional de Racionalización y Normalización *Spanish Standard UNE 33-103-75 part I*, 4pp. (1975) [Es]





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FAB 15

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FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

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H. BROOKES

ASSISTANT EDITOR



## 1

**[Aroma compounds in foods.]**

Bemelmans, J. M. H.

**TNO-Project 4** (7/8) 263-270 (1976) [7 ref. Nl] [Cent. Inst. voor Voedingsonderzoek TNO, Zeist, Netherlands]

Topics discussed in this review-type article include: aroma compounds; research on aroma compounds; sensory evaluation; sensory quality control; toxicity of aroma compounds; and legal aspects. JA

## 2

**[Sensory evaluation of foods.]**

Sauvageot, F.

**Revue de la Conserve Alimentation Moderne** No. 44, 71-72 (1976) [Fr] [Lab. de Biol. Physicochem., ENSBANA, France]

Methods and equipment used by ENSBANA in training its students in the application of techniques for sensory evaluation of foods are outlined. SKK

## 3

**[Statistical analysis of wine tests with new and comparative grape varieties from an experimental cultivation in the Upper Mosel region. I. Reliability of testers in sensory tests.]** Statistische Analysen

von Testproben bei Weinen und Reben-Neuzuchten und Vergleichssorten aus einem Versuchsanbau im Gebiet der oberen Mosel. I. Die Verlässlichkeit der Prüfer im Rahmen der sensorischen Prüfung. Weiling, F.; Schöffling, H.

**Weinberg und Keller** 23 (4) 145-168 (1976)

[many ref. De, en, fr] [Inst. für Landwirtschaftliche Bot.-Biometrie, Univ., Bonn, Federal Republic of Germany]

Wines produced from 2 established (Elbling, Müller-Thurgau) and 8 newly developed grape var. (Bacchus 133, Freisamer, Gutenborner, Kerner, Osiris, Reichensteiner, Regner, Würzer) were tested during 3 seasons by groups of 11 or 12 experts and equal numbers of ordinary consumers. Each vintage was examined in 4 independent test series. Wines were presented under randomized numbers (which were changed for each test) to be graded on a 10-point scale. The reliability of the testers was evaluated statistically by the chi-squared test. The reliability of the sensory evaluation varied from tester to tester and from vintage to vintage. When unreliable testers were excluded, no significant difference was found between the reliability of experts and non-experts. As the reliability even of experts was variable, sensory tests should always be combined with tests of reliability, for which 1 repetition ( $n = 2$ ) is adequate. RM

## 4

**[Statistical analysis of wine tests with new and comparative grape varieties from an experimental cultivation in the Upper Mosel region. II. Methods and results of rank-order tests.]** Statistische

Analysen von Testproben bei Weinen und Reben-Neuzuchten und Vergleichssorten aus einem Versuchsanbau im Gebiet der oberen Mosel. II. Methodik und Ergebnis der Rangordnungsprüfung. Weiling, F.; Schöffling, H.; Unger, C.

**Weinberg und Keller** 23 (5) 181-210 (1976) [22 ref. De, en, fr] [Inst. für Landwirtschaftliche Bot.-Biometrie, Univ., Bonn, Federal Republic of Germany]

Following the elimination of unreliable testers, the agreement in evaluation of wines and vintages by the remaining testers was studied, and their numbers reduced to form a group of testers with roughly corresponding judgments. The statistical methods used are explained with the aid of numerical and graphical results. The method for distinguishing wines is illustrated by an example. The number of wines or wine quality groups distinguished by the testers varied from 5 to 7 with the established var. in the lowest quality groups. Individual results varied from yr to yr. The chi-squared test used was preferred to Kramer's method [see *Food Technology* (1960) 14, 576-581]. Results of the investigation are discussed with regard to tester groups, seasons, treatment of grapes and of musts, possibility of substituting or blending var. Elbling with new var., and discrimination in sensory tests. RM

## 5

**[Results of the 3rd DLG sensory seminar.]**

Erfahrungen und Ergebnisse des 3. DLG-Sensorik-Seminars.

Seibel, W.

**Getreide, Mehl und Brot** 30 (7) 189-194 (1976)

[7 ref. De] [Bundesforschungsanstalt für Getreide- & Kartoffelverarbeitung, Detmold, Federal Republic of Germany]

Details are given of the 3rd DLG (Deutsche Landwirtschafts-Gesellschaft) seminar which involved the sensory evaluation of bread and bakery products. Results are given and evaluated and some general conclusions drawn. The scales employed in ranking foods via their organoleptic characteristics are discussed and details are given of the methods used in establishing threshold values for various tastes, e.g. sweet, salty, sour. Products subjected to sensory evaluation included several types of bread, 'raisin mares' (Rosinenstuten), coconut macaroons, flan cases, sand cakes, and gingerbread hearts. [See *FSTA* (1976) 8 3M320 for the 2nd seminar.] JVR

## 6

**Analysis of sensory rating scales.**

Cloninger, M. R.; Baldwin, R. E.; Krause, G. F.

**Journal of Food Science** 41 (5) 1225-1228 (1976) [17 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Missouri, Columbia, Missouri 65201, USA]

Data from 9 previous sensory studies utilizing scales varying from 5 to 15 points were normalized by calculating z values to estimate the position of categories on the psychological continuum. Normalized data from studies utilizing a 5-point



scale for sensory evaluations were nearly equally spaced as is assumed for many statistical analyses. However, a central tendency was observed in scores for flavour on 9- and 15-point scales. If data from an extensive ordinal scale are to be transformed, normalized category means can be substituted for raw scores before statistical analysis. IFT

## 7

**Changes of sensory value by interaction of alkanals with amino acids and proteins.**

Pokorny, J.; Luan, N.-T.; Kondratenko, S. S.; Janicek, G.

*Nahrung* 20 (3) 267-272 (1976) [23 ref. En, de, ru] [Dep. of Food Chem., Prague Inst. of Chem. Tech., Prague, Czechoslovakia]

Model mixtures of aldehydes with casein or cellulose were examined for odour intensity at intervals during heating at 60°C for 24 h in the presence of 5 or 50% water. With increasing heating time the odour intensity of propanal decreased in the presence of casein, but showed irregular changes in the presence of cellulose; similar results were obtained with octanal, hexanal and butanal, and in the presence of 5 or 50% water. The presence of 10 mg lysine/g cellulose decreased the odour intensity of propanal during heating. The effects of the formation of odours aldolization products or polymers on the sensory evaluation by inexperienced judges are discussed. MEG

## 8

**[Sensory evaluation of stevioside as a sweetener.]**

Isima, N.; Kakayama, O.

*Report of the National Food Research Institute [Shokuryo Kenkyusho Kenkyu Hokoku]* No. 31, 80-85 (1976) [13 ref. Ja, en] [Nat. Food Res. Inst., 1 Shiohama 4-12, Kotoku, Tokyo, Japan]

*Stevia rebandiana* Bertoni is a Paraguayan weed containing an intensely sweet principle named stevioside, which may have potential as a sweetener to replace sucrose or saccharin. Organoleptic tests with trained panels, using a newly developed 'incomplete paired comparison' test routine showed that highly refined stevioside (93-95%) had a long aftertaste and some bitterness and astringency not found in less pure (50%) preparations. Sweetness intensity of stevioside was 300 times that of 0.4% sucrose, 150 times that of 4% sucrose and 100 times that of 10% sucrose. Stevioside mixed with acetic acid, citric acid or salt had similar taste properties, but mixing with sucrose, fructose or glucose improved its unpleasant sweetness. [From En summ.] JRR

## 9

**Flavor chemical mixtures - a psychophysical analysis.**

Moskowitz, H. R.

*Abstracts of Papers, American Chemical Society* 172, AGFD 82 (1976) [En] [MPI Sensory Testing Inc., 770 Lexington Avenue, New York, New York 10021, USA]

A series of studies with chemicals mixed together in vapour phase and evaluated by panelists for odour intensity, odour hedonics, and odour quality (character) revealed the following general rules: odour intensity is a power function of odorant concn. for unmixed odorants, with an exponent  $<1.0$ ; odour hedonics are often a monotonic function of concn., but cannot be modelled by a power function; odour quality can be captured by means of a profiling system, using magnitude estimation as the measuring system; in binary mixtures, odour intensity is usually suppressed for the more intense component, so that the final mixture intensity is somewhere between the intensities of the components; in binary mixtures, hedonics are often changed, so that the addition of a pleasing component to a displeasing one makes the mixture more pleasing; mathematical equations can be developed to model some of the mixture effects; and the change in odour quality in mixture is a function of the type of odorants, their quality and their starting odour intensity. AS

## 10

**Measurement of flavour quality in apples and fermented ciders.**

Williams, A. A.; Lea, A. G.; Timberlake, C. F. *Abstracts of Papers, American Chemical Society* 172, AGFD 107 (1976) [En]

In order that quality can be defined more precisely, use is being made of a 3-directional approach in which sensory assessment by panellists is integrated with preference information on the one hand and analytical data on the other. The paper discusses the application of this approach to aspects of the flavour quality of apples and ciders, in particular the interrelationship between sensory characters and analytical data. Sensory procedures combined with GLC and GLC-MS have enabled the cause of an important spicy character in certain types of apples to be determined. Counter-current and liquid chromatographic techniques coupled with sensory appraisal methods have been used to give information on the contribution of procyanidins to the bitterness and astringency of cider. AS

## 11

**[Interpretation of the results of board wine tasting.]**

Überlegungen zur Auswertung von Ergebnissen der kommissionellen Weinverkostung.

Schneyder, J.

*L und E* 29 (6) 149-153 (1976) [De, en] [Landwirtschaftlich-Chem. Bundesversuchsanstalt, Trunnerstrasse 1, A-1020 Vienna, Austria]

Routine tasting results were used to derive the mean probability of correct evaluation, and the necessary voting ratios fixed for significant ( $\geq 95\%$  probability), highly significant ( $\geq 99\%$ ) and extremely significant ( $\geq 99.9\%$ ) evaluations. In addition, voting ratios were established for some probabilities in quality evaluations. Based on a list of terms used by the testers, the efficiency of confirming spontaneous signalling of wine defects was ascertained.



Independent spontaneous detection of the same defect by 2 tasters may be regarded as highly significant, by 3 tasters as extremely significant. The results are proposed as a basis for establishing official voting ratios in wine tasting boards. RM

## 12

### Component analysis as an objective-sensory tool.

Powers, J. J.; Bargmann, R. E.

*Abstracts of Papers, American Chemical Society* 172, AGFD 106 (1976) [En] [Dep. of Food Sci., Univ. of Georgia, Athens, Georgia 30602, USA]

Frozen and canned green beans were evaluated by a hedonic-description procedure for acceptability, flavour, texture, colour and appearance. Beans were also rated for 21 specific attributes related to quality. Fresh, cooked green beans were used as a reference. The various simple and multiple correlation coeff. among the factors were calculated to ascertain which factors were important in determining acceptability. One-way analysis of variance was used to eliminate judges who could not discriminate among products. The same procedure was used to eliminate terms which show no significance between products or were not used by the panelists. By factor analysis, 6 factors were identified. A 2nd study was designed to enable possible relations between sensory attributes and physico-chemical measurements to be examined. Data were analysed to determine whether sensory and objective measurements constituted separate domains or whether there was a linkage detectable by factor or component analysis. Application of the procedures to development of combination sensory-objective methods for assessment of food quality is described. AS

## 13

### Exponential values of the psychophysical power function for sucrose obtained by two different estimation methods.

Kroeze, J. H. A.

*Chemical Senses and Flavor* 2 (1) 39-43 (1976) [6 ref. En] [Psychological Lab., State Univ., Utrecht, Netherlands]

2 methods of magnitude estimation were compared. In 1 condition subjects made a numerical judgement of a series of taste stimuli. In the other condition the same subjects were required to express their intensity of judgement by matching the length of a line to it. The resulting exponents of the 2 psychophysical power functions did not differ from each other. The meaning of this result is briefly discussed. AS

## 14

### Structural and mechanical influences on food quality.

Vickers, Z. M.

*Abstracts of Papers, American Chemical Society* 172, AGFD 83 (1976) [En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St. Paul, Minnesota

55108, USA]

The perception of flavour is affected by a variety of food quality factors. The quality characteristics which arise from structural and mechanical properties of foods are examined in detail. Sound and texture are both such characteristics. The paper includes a discussion of how some acoustical and textural attributes arise and why they may service as indicators of flavour quality. AS

## 15

### [Assessment of the sensitivity of individuals to the basic food tastes.]

Bende, E.; Szabo, A.; Huber, M.

*0128af* 22 (9) 410-413 (1975) [3 ref. Hu]

[Megyei Elelmiszerell. es Vegyvizsg. Intezet, Gyor, Hungary]

The results of studies (involving 35 people) on individual differences in sensitivity to the 4 basic tastes (sweet, sour, bitter and salty) are discussed; solutions of sucrose, citric acid, quinine sulphate and NaCl of graded concn. were used. Min. detectable quinine concn. in this study was lower (by one order of magnitude) than those given in the literature. IF

## 16

### Experimental design and analysis of sensory tests.

[Lecture]

Sidel, J. L.; Stone, H.

*Food Technology* 30 (11) 32, 34, 36-38 (1976) [14 ref. En] [Tragon Corp., PO Box 783, Palo Alto, California 94302, USA]

This article discusses the primary components of proper experimental design and stresses that the appropriate experimental design and analysis should be selected well in advance of the actual sensory experiment. IFT

## 17

### Comparison of SIGMLOT, probit, and extreme-value methods for the analysis of threshold data.

Powers, J. J.; Ware, G. O.

*Chemical Senses and Flavor* 2 (2) 241-253 (1976) [20 ref. En] [Dep. of Food Sci., Georgia Agric. Exp. Sta., Univ. of Georgia, Athens, Georgia 30602, USA]

2 panels consisting of 12 and of 14 members, respectively, evaluated solutions of ethyl caprylate at different concn. to establish flavour detection thresholds. The resulting frequencies of success at each concn. level were analysed by a probit method and Drake's procedure [FSTA (1976) 8 5A244]. These 2 methods in turn were compared with extreme-value analysis. Agreement among the 3 methods was good. The lowest threshold observed was 0.00069 ppm and the highest, 26.9 ppm. An extreme-value plot is presented for 59 detn. obtained in prior studies [FSTA (1973) 5 11A482] and the 26 values of this study. The limitations and advantages of each method of calculation are discussed as are precautions relative to the way the

extreme-value data should be accumulated or arrayed for analysis. AS

## 18

### Comparison of discrimination ability between taste panel assessors.

Basker, D.

*Chemical Senses and Flavor* 2 (2) 207-209 (1976)  
[3 ref. En] [Div. of Food Tech., Agric. Res. Organization, PO Box 6, Bet Dagan, Israel]

Expanded tables are presented for the selection of assessors for taste panels. These tables may also be used for comparing the assessors' discrimination ability, after the panel sessions have been completed. AS

## 19

### What sensation signals the salt taste threshold?

O'Mahony, M.; Kingsley, L.; Harji, A.; Davies, M.  
*Chemical Senses and Flavor* 2 (2) 177-188 (1976)  
[44 ref. En] [Univ. of Bristol, UK]

Ascending series of solutions of NaCl and LiCl were tasted and, while detection and recognition thresholds were noted, subjects were required to determine the number of taste sensations that occurred, as well as their sequence. It was found that subjects varied in their reports of the number of taste changes and hence criteria used for thresholds. Even among those subjects who reported the same number of criteria, no consistency was found as to which were chosen for 'detection' and 'recognition'. This demonstrates the potential of the criterion as a variable for threshold measures, and because of this, criterion-free measures are recommended. Taste quality descriptions were also studied and they yielded a large proportion of novel terms, due probably to instructional modifications. AS

## 20

### Difference taste thresholds for sucrose in water and in orange juice: an interlaboratory study.

Lundgren, B.; Pangborn, R. M.; Barylko-Pikielna, N.; Daget, N.

*Chemical Senses and Flavor* 2 (2) 157-176 (1976)  
[9 ref. En] [Swedish Food Inst., S-400 21 Göteborg 16, Sweden]

Difference taste thresholds, expressed as jnd ('just noticeable differences') values or Weber ratios, were determined for sucrose in water and in orange juice at laboratories in Sweden, USA, Poland and Switzerland using a method of constant stimuli. The following total arithmetic mean values of all 172 individual jnd values were obtained: 0.266 and 0.400% sucrose at 2 and 5% sucrose in water, respectively; 0.977 and 1.19% sucrose at 1.5 and 3.75% sucrose in orange juice, respectively. Frequency distributions of individual values were asymmetrical and showed a large variation among subjects. Results of additional experiments at 2 and 5% sucrose in orange juice are also reported. Significance analyses performed according to a parametric method (t-test), using pooled data of

groups of subjects, and a non-parametric method (Mann-Whitney's U-test), using individual threshold values, gave the same conclusion in practically all cases. Females had slightly lower average discrimination thresholds than males.

There was a significant degree of correlation between subjects' discriminatory ability at different concn. of sucrose in each of the 2 media. Few significant differences between laboratories were found for sucrose in water, whereas for sucrose in orange juice the following rank order, from lowest to highest average jnd value, among the laboratories was obtained for both concn. tested: Poland < USA < Sweden = Switzerland. Some speculations were advanced as partial explanation for the differences among the laboratories. [See also FSTA (1973) 5 9A410.] AS

## 21

### Evaluation of potato texture by taste and by appearance.

Davies, H. T.; Dixon, N. C.

*American Potato Journal* 53 (6) 205-210 (1976)  
[5 ref. En, es] [Res. Sta., Agric. Canada, Fredericton, New Brunswick, Canada]

A description is given of the evaluation of potato texture using taste and appearance of tubers. The scoring system used was: 40 points - very mealy; 35 points - mealy; 25 points - slightly mealy; 15 points - soggy; and 0 points - very soggy. Mean scores for textures for all tests, rated by taste method and visually, respectively, were: 1968 crop, 27.9, 29.2; 1969 crop, 23.0, 24.7; 1973-1974 crop, 29.3, 29.9. The mean scores for the visual rating of texture were higher than those rated by taste, and for the 1973-1974 crop the differences were considerably less. A comparison was made of the average of the 2 scores for months of Dec., Jan., Feb., and March for the 1969 and 1973-1974 crops. The high correlation found in 7 of the 8 comparisons between the average scores by taste and by appearance suggest that the visual method would be acceptable when large numbers of samples have to be screened. VJG

## 22

### The use of a rotational fitting technique in the interpretation of sensory scores for different characteristics.

Harries, J. M.; MacFie, H. J. H.

*Journal of Food Technology* 11 (5) 449-456 (1976) [11 ref. En] [Meat Res. Inst., Langford, Bristol, Avon BS18 7DY, UK]

A rotational fitting technique [FSTA (1975) 7 7S 1022] was applied to 2 sets of data [visual scores of sides of beef and textural assessments of cooked samples of beef] from experiments involving sensory perception, to examine mutual relationships between the characteristics scored. In both cases, considerable insight was gained into the way in which assessors scored the characteristics. This information could be used in designing future experiments of the same type. AS



## 23

**Exploring the relationship between sensory data and acceptability of meat.** [Lecture]  
Horsfield, S.; Taylor, L. J.

*Journal of the Science of Food and Agriculture* 27 (11) 1044-1056 (1976) [15 ref. En] [Unilever Res. Lab., Colworth House, Sharnbrook, Bedfordshire MK44 1LQ, UK]

A multi-parameter scoring system for the sensory characteristics of the texture and flavour of meat or meaty products was developed. A trained panel used the system to give sensory data on 13 products. Principal Components Analysis of this data showed that the parameters of the system could be reduced to 3 independent components (toughness, succulence and flavour) with little loss of information. The acceptability of the products (as measured by an independent panel of consumers) was shown to be predictable from the 3 derived components. Optimal acceptability regions in the 3-dimensional sensory space were then identified. AS

## 24

**Summer school 74 - proceedings in sensory analysis of odour and taste.** [Conference proceedings]  
Poland, Polish Academy of Sciences, Committee of Food Chemistry & Technology  
*Acta Alimentaria Polonica* 2 (3) 109-244 (1976) [many ref. En, pl]

This issue of the journal contains the proceedings of the symposium Summer school 74 on Sensory analysis of odour and taste, held in Pulawy, Poland, on 10-12 June 1974. Papers include: The influence of new achievements in sensory analysis on subjective gustometry and olfactometry, by J. Herrmann (pp. 113-132, 31 ref.); Modification of 'stair-case' method for simultaneous determination of detection and recognition thresholds on the example of spices, by T. Przedzdziecka & Z. Baldwin (pp. 163-166); Application of constant stimuli method for odour and flavour difference threshold determination of spices on neutral carriers, by Z. Baldwin & T. Przedzdziecka (pp. 167-169, 3 ref.); Application of combined sensory assessment test for quantitative evaluation of quality of roasted coffee, by F. Örsi (pp. 171-174); Progress in standardization of quality evaluation by sensory methods in GDR, by R. Neumann (pp. 185-193, 28 ref.); Application of sensory analysis in the work of the State Inspection of Food Quality [in Czechoslovakia], by J. Barvir (pp. 195-199); Standardization of sensory methods on international and national level, by A. Zaboklicki (pp. 201-205); [continued in following abstr.] AL

## 25

**Summer school 74 - proceedings in sensory analysis of odour and taste.** [Conference proceedings]  
Poland, Polish Academy of Sciences, Committee of Food Chemistry & Technology  
*Acta Alimentaria Polonica* 2 (3) 109-244 (1976) [many ref. En, pl]

[Continued from preceding abstr.] Determination of odour absolute threshold of some sulphur compounds, by E. Pietrzak & N. Barylko-Pikielna (pp. 207-212, 5 ref.); Main group components of aroma in amino acid-sugar model systems, by Z. Mielniczuk, N. Barylko-Pikielna & M. Daniewski (pp. 213-221, 15 ref.); Some comments on the vibrational theory of olfaction, by K. B. M. Miler (pp. 223-231, 27 ref.); Stereostructure of sugars and sugar derivatives influencing their taste properties, by A. Kurkowska-Mielczarek (pp. 233-234, ref.); Recent progress in sensory methods, by N. Barylko-Pikielna (pp. 235-237); Instrumental vs. sensory analysis of odourous substances: possibilities and limitations, by K. B. M. Miler & N. Barylko-Pikielna (pp. 239-240); and Sensory characteristics of volatile substances of microbial origin separated by gas chromatography, by E. Kaminski, S. Stawicki & A. Niewiarowicz (pp. 241-242). A further 4 papers are abstracted separately and are in the author index under Poland, Polish Academy of Sciences, Committee of Food Chemistry & Technology [Sensory Analysis Symposium]. AL

## 26

**[Methods for checking the taste sensitivities of taste panellists.]**

Gyurov, I.; Koen, P.; Abrashev, P.  
*B'lgarski Plodove Zelenchutsi i Konservi* No. 3, 21-24 (1976) [Bg]

A 3 stage programme for testing the sensitivity of the sense of taste of personnel to be used on taste panels is described. Stages are: testing ability to differentiate the 4 basic tastes; detn. of sensitivity for each basic taste; and testing the min concn. at which the tastes may be reliably differentiated (using paired, duo-trio or triangle tests). STI

## 27

**Flavour, odour and taste evaluation in food products.**

Purushothaman, C. S.  
*Packaging India* 8 (3) 32-33, 38 (1976) [En]  
[Indian Inst. of Packaging, Bombay 400 093, India]

The usual methods of food evaluation by organoleptic testing, viz. the triangle test, difference tests, preference tests and profiling are discussed and their relative merits are considered. The suppression of uncontrolled influences upon the reliability of such tests is also mentioned, including order of sample presentation, pejorative symbols, etc. JRR

## 28

**Sensory evaluation of food quality by scoring.** [Lecture]

Lasztity, R.; Örsi, F.  
*Acta Alimentaria Polonica* 2 (3) 133-143 (1976) [7 ref. En, pl] [Inst. of Biochem. & Food Tech., Tech. Univ., Budapest, Hungary]

After presenting the mathematical model of the evaluation method based on scoring, discriminatory analysis was applied for detn. of weighting factors



necessary for simulation. Application of the method is demonstrated with canned peaches. [See FSTA (1977) 9 4A243.] AS

## 29

**Practical applicability of profile method.** [Lecture] Molnar, P.

*Acta Alimentaria Polonica* 2 (3) 145-155 (1976) [10 ref. En, pl] [Fachabteilung Nahrungsgüter des ASMW, Berlin (GDR)]

Some aspects of the practical application and limitations of the sensory profiling method for quality control are discussed, using blackcurrant juices and nectars as examples. The scoring method and evaluative profile method are compared. [See FSTA (1977) 9 4A243.] AL

## 30

**[Quality assessment of wine. Carrying out organoleptic tests.]** Qualitätsbeurteilung von Wein. Durchführung von sensorischen Prüfungen. Grosser, H.-U.

*Deutsche Weinbau* 31 (33/34) 1263-1264 (1976) [1 ref. De] [Landwirtschaftskammer Rheinland-Pfalz, Bad Kreuznach, Federal Republic of Germany]

Panel tests are discussed against the background of relevant German Federal ordinances and the German Agricultural Society (DLG) organoleptic test schemes for wine. The required size of a panel is considered; and the relative merits are discussed of tests carried out by the experts standing (with freedom of repeated sampling of a given wine, but exposure to diversion by movement and deliberate or accidental influence of other panel members), or by the numerous modifications of tests carried out sitting (at 1 or separate tables or in separate cubicles). The average result from a panel judging in separate cubicles is favoured as the more objective. SKK

## 31

**[Statistical analysis of wine tests with new and control grape varieties from experimental cultivation in the upper Mosel. III. Chemical and organoleptic analyses.]** Statistische Analysen von Testproben bei Weinen von Reben Neuzuchten und Vergleichssorten aus einem Versuchsanbau im Gebiet der oberen Mosel. III. Analyse der Probenergebnisse unter Berücksichtigung der chemischen Analysen.

Weiling, F.; Unger, C.; Schöffling, H.  
*Weinberg und Keller* 23 (7) 285-311 (1976) [10 ref. De, en, fr]

Major chemical characteristics (alcohol, sugar-free extract, residual sugar, tartaric acid, residual acidity, pH) were examined by multivariate variance analysis (Manova) following a 2-way classification model without repetition; variables used were var. and vintage yr. Wines of 2 var. (Freisamer and Regner) were significantly different

from the others. The statistical model is explained, and results of analysis are discussed with reference to organoleptic evaluations. Ranking sums of single evaluations of reliable judges were related to individual chemical characteristics for each vintage and tester group by simple correlation and univariate multiple regression analysis. Sugar-free extract and pH were omitted, as they correlated strongly with the other characteristics. When sugar-free extract was replaced by residual extract [Wein and Rebe (1971) 54, 493-495, 520-524], correlation with other characteristics was much reduced without significant additional information. Very strong correlations were found between experts' and consumers' evaluations ( $r = 0.9054-0.9834$ ). In simple analyses, significant correlations were found between evaluations by both groups and residual sugar (1971, 1973) and alcohol content (1973). Multiple regression analysis was significant for 1971 vintage (residual sugar; alcohol and tartaric acid for experts only). The investigations are discussed with respect to a possible substitution or complementation of the var. Elbling by more satisfactory new var. [See FSTA (1977) 9 1H81 for part II.] AS

## 32

**[Training of a tasting panel and the technique of beer tasting.]**

Curin, J.

*Kvasny Prumysl* 22 (9) 198-201 (1976) [4 ref. Cs, ru, en, de] [Pokusne a Vyrojove Stredisko GRPS, Prague, Czechoslovakia]

The importance of sensory evaluation of beer and of maintaining basic conditions which ensure true results for sensory analysis is stressed. One important condition is systematic training of a tasting panel and the technique of tasting. Observations made over a long period are described with comments on the characteristics of individuals and on the work of the panel as a whole. New techniques for tasting are described which improve the authenticity of results. A more detailed specification of a suitable technique for beer tasting could be developed and experience has been gained which should be applied in enterprises engaged in large-scale production. STI

## 33

**[Correlation between organoleptic evaluation and laboratory analysis of White pickled cheese.]**

Rusev, Kh.

*Veterinarnomeditsinski Nauki* 13 (8) 81-85 (1976) [3 ref. Bg, ru, en] [Tsentralen Vet. Inst., Sofia, Bulgaria]

102 samples of cows' milk and 103 samples of ewes' milk White pickled cheese from different Bulgarian cheese factories were classified organoleptically by a 5-person panel on acidity and saltiness respectively into slight, normal and strong categories; and titratable acidity ( $^{\circ}\text{T}$ ) and NaCl content were determined analytically. The results are tabulated. Satisfactory correlation (agreement

in 84% of comparisons) was obtained between the 'normally acid' grading and the 201-300°T titratable acidity range, but neither the 'slightly acid' nor the 'strongly acid' grading correlated satisfactorily with titratable acidities of  $\leq 200^\circ\text{T}$  or  $> 300^\circ\text{T}$ , respectively. For saltiness, agreement ranged between 78.5 and 93.1%, best correlation being for 'normal saltiness' (3-5% NaCl), and the least marked correlation being for 'slight saltiness' ( $< 3\%$  NaCl). It is concluded that in saltiness assessment, organoleptic evaluation should suffice, except in cases of doubt. SKK

### 34

[Cream. Preliminary analysis tests. Preliminary examination.]

Portugal, IGPAl Reparticao de Normalizacao  
*Portuguese Standard* NP 633, 1p. (1973) [Pt]

This standard gives brief instructions for preliminary evaluation of the organoleptic properties (appearance, colour, aroma, taste) of cream samples. AJDW

### 35

Sensory properties of foods. Abstracts of 4th Nordic Symposium, held at Billingeus, Skövde, Sweden, March 18-20 1976. [Conference proceedings]

Sweden, Swedish Food Institute

61pp. (1976) [En] Göteborg, Sweden

[Continued from preceding abstr.] Synergism between fructose and saccharin, by L. Hyvönen (p. 37); A compilation of human odour threshold values in air, by L. J. van Gemert & H. Maarse (p. 39); Analysis of an earthy taint in a malt distillate, by J. M. H. Bemelmans & N. L. A. te Loo (p. 41); Odour and taste changes in potatoes during warmholding, by B. Karlström (pp. 43-44); The volatile compounds in edible fresh mushrooms, by H. Pyysalo (p. 45); The aroma of some berries in the genus *Rubus*, by T. Pyysalo & Honkanen (p. 47); Aroma and flavour description of coffee and instant coffee, by J. van Roekel (p. 49); Instrumental and sensory analysis of the volatile compounds in unconventional proteins, by I. Qvist (p. 51); Some flavour aspects of hydrolysed vegetable protein (HVP), by S. Eriksen (p. 53); Production of foods for catering, by L. F. Onarheim (pp. 55-58); Quality of foods for catering, by P. Skråder (pp. 59-60); and Aroma and taste in food legislation, by C.-A. Vodoz (p. 61). VJG

### 36

[Specialized tests for members of panels for organoleptic evaluation of poultry and eggs.]

Bacikova, Z.

*Hydinarsky Priemysel* 18 (4/5) 194-204 (1976) [Sk] [Vyskumny Ustav Hydinarskeho Priemyslu, Bratislava, Czechoslovakia]

Special tests, organized by the Bratislava Research Institute for the Poultry Industry, covered: flavour differentiating ability, parallel tests for detn. of threshold differences, detn. of flavour memory, aroma differentiation, and differentiation of colour intensity in clear and opaque solutions. The greatest incidence of errors was in the detn. of threshold differences. STI

### 37

[Taste identification trials for selection of personnel for taste panels.]

Szabo, A.; Bende, E.

*Husipar* 24 (5) 226-229 (1975) [8 ref. Hu, en, de, ru] [Megyei Elelmiszerellenőrző és Vegyvizsgáló Intézet, Lukács S. u. 14, 9022 Győr, Hungary]

Studies were conducted to determine the taste threshold values of 37 persons, using NaCl, citric acid, sucrose and quinine sulphate test solutions of graded concn. A table of results is given. Mean threshold concn. were: NaCl 0.02800%; citric acid 0.04200%; sucrose 0.27500%; and quinine sulphate 0.00022%. The threshold concn. for quinine sulphate was approx. 1 order of magnitude lower than that expected from literature data. A brief account is also given of a study on capability of 28 panellists to identify the aromas of 5 herbs and spices. The % erroneous identifications were: cloves, 14; cinnamon, 14; cumin or caraway seed, 4; pepper, 14; and marjoram, 11. AJDW

### 38

[Measurement of flavour and aroma perception.]

Szabo, A.; Bende, E.

*Tejipar* 25 (2) 29-33 (1976) [16 ref. Hu, en, ru] [Megyei Elelmiszerellenőrző és Vegyvizsgáló Intézet, Győr, Hungary]

After a brief introduction, the testing of flavour perception is discussed. It is pointed out that in Hungary dairy products are marked out of 20 for organoleptic quality, with the greatest emphasis on flavour, e.g. best butter can receive a max. mark of 2 for appearance, 2 for body, 3 for moisture distribution and quality of working, 3 for odour, and 10 for flavour. Best butter cannot be put on the market unless it has a total score of  $\geq 15$  and a flavour/odour score of  $\geq 9$ . The qualities required of organoleptic assessors are discussed, as well as factors affecting flavour perception. Results are then reported of experiments carried out with the participation of 35 quality control experts to determine the threshold values at which the 4 basic flavours (sweet, sour, bitter, salty) could be perceived. With the exception of sour flavour, the average threshold concn. were lower than those reported in the literature: the values determined (g/l.) were 0.41 for sour (citric acid), 0.28 for salty (NaCl), 0.0022 for bitter (quinine sulphate) and 2.75 for sweet (sucrose). Results of tests on the assessors' performance are given, and the following solutions (g/l.) are recommended for testing



suitability of assessors: 4.0-8.0 sucrose, 0.5-1.0 citric acid, 0.0025-0.005 quinine sulphate, 0.5-1.0

NaCl. Finally, experiments concerning odour perception are discussed: among 28 assessors the error % was 0 for identification of  $\text{NH}_3$ , acetic acid and ethanol, 4 for cumin, 11 for marjoram, and 14 for cinnamon, pepper and cloves. ADL

## 39

**Prediction of sensory response to textural parameters of breaded shrimp shapes using Instron texture profile analysis.**

Soo, H.-M.; Sander, E. H.

*Journal of Food Science* 42 (1) 163-167 (1977)

[8 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St. Paul, Minnesota 55108, USA]

A method for objective measurement of textural parameters of fabricated comminuted shrimp-binding matrix agent mixtures using the universal testing machine (Instron) has been developed. An abbreviated Instron texture profile analysis (TPA) of fabricated cooked shrimp was used to predict sensory textural scores on subsequent mechanically extruded shrimp shapes. The technique eliminates expensive and time-consuming pilot plant operation of equipment to produce a sufficient quantity of shrimp shapes required to measure single formula and process parameters. IFT

## 40

**Wines: their sensory evaluation.** [Book]

Amerine, M. A.; Roessler, E. B.

xiv + 230pp. ISBN 0-7167-0553-2 (1976) [81

ref. En] San Francisco, USA; W. H. Freeman &

Co. Price £6.20 [Univ. of California, Davis, California, USA]

This book describes what the authors believe to be the best approach to the sensory evaluation of wine and gives guidance in making meaningful decisions about wine quality. The book contains 2 parts: Wines and their sensory examination (pp. 1-97) and Statistical procedures (pp. 99-176); 10 appendices (pp. 177-191), consisting of statistical tables; a glossary (pp. 193-205) of useful terms; an annotated bibliography (pp. 207-214); and a subject index (pp. 215-230). Chapters contained in Part I are: Wine quality (pp. 2-17); The senses (pp. 18-47); Factors affecting sensory response (pp. 48-54); The sensory examination (pp. 55-71); Composition of wines (pp. 72-77); and Types of wines (pp. 78-97). Part II discusses the variety of statistical procedures available for quantitatively evaluating the differences among wines and for measuring their overall quality. JA

## 41

**An evaluation of the Davis wine score card and individual expert panel members.**

Ough, C. S.; Winton, W. A.

*American Journal of Enology and Viticulture* 27

(3) 136-144 (1976) [9 ref. En] [Dep. of Enology & Viticulture, Univ. of California, Davis, California 95616, USA]

Responses of a panel of expert judges were measured over 14 yr. Their abilities to distribute scores normally on an unbalanced score card and a balanced score card were tested. In some instances it took years for a panel member to adjust to the score card so that a normal distribution of his score resulted. With the balanced score card a normal score distribution resulted in the 1st yr of use. The ability of judges to repeat their scoring on the same wine was tested for this extended period. The ranges of score (2-98%) used each yr were also measured. It was determined that the ratio of the individual judge's 96% score range to the SD was a fair single measure of the judge's ability to use the score card effectively. Of the 6 judges who tasted over the extended period, only 1 had a concept of quality significantly different from that of the others. The individual panel members stabilized in sensitivity after about 5 yr training. The yearly panel mean score values declined almost 1 full point before stabilizing, after 7 yr. Other statistics are included. AS

## 42

**[International system of descriptive terms for objective sensory evaluation of beer.]**

Curin, J.

*Krasny Prumysl* 22 (10) 217-222 (1976) [3 ref.

Cs] [Pokusne a Vyrobove Stredisko GRPS, Prague, Czechoslovakia]

The importance of coordinated use of descriptive terms for objective sensory beer evaluation is emphasized. The proposed international system of descriptive terms elaborated by many international specialists is considered, and is supplemented by corresponding terms in Czech. The original proposal giving terms in 3 languages serves not only for elaboration of the appropriate terms in Czech but also for unification of translating practice. STI

## 43

**Tasmanian fish products undergo taste tests.**

Anon.

*Australian Fisheries* 35 (12) 23 (1976) [En]

Results of taste tests conducted by CSIRO's Tasmanian Food Research Unit on the acceptability of locally-produced smoked eel, fish sausages and fish fingers are briefly reported. Fish fingers made from morwong (*Nemadactylus macropterus*) or redfish (*Centroberyx affinis*) were liked 'very much' by 23% and 30% respectively and liked at least 'slightly' by the majority of tasters. Smoked eel was rated 'very acceptable' by 44% and 'acceptable' by 53%. Spiced highly-smoked fish sausages prepared from ocean perch (*Helicolenus papillosus*) were reported to be delicious in small pieces as a cocktail snack, but comparison with meat sausage is unrealistic and categorized responses were variable. AL

## 44

[Measurement of organoleptic properties. Principles of analysis and sensory metrology.] [Review]  
Depledge, F.

*Connaissance de la Vigne et du Vin* 10 (4) 345-357 (1976) [34 ref. Fr, en, de, es, it]

Sensory analysis is defined, its applications in the food industry are discussed, and techniques are described briefly. Examples include the levels of perception and identification of different sugars, the sweetening power of various substances, the thresholds of perception of the 4 basic tastes; factors involved in perception (using tartaric acid, caffeine, sodium chloride, sucrose as standards); perception tests including basic odours; and descriptive tests and the value of special laboratories for investigating organoleptic properties. VC

## 45

Taste quality descriptions: Can the subjects' response be affected by mentioning taste words in the instructions?

O'Mahony, M.; Thompson, B.

*Chemical Senses and Flavor* 2 (3) 283-298 (1977) [77 ref. En] [Dep. of Psychology, Univ. of Bristol, 8-10 Berkeley Square, Clifton, Bristol BS8 1HH, UK]

Subjects were required to give taste descriptions for 8 stimuli: NaCl, sucrose, citric acid, quinine sulphate, monosodium glutamate, sodium benzoate, sodium carbonate and purified water, under various instructional procedures. When the taste words 'sweet', 'sour', 'salty', 'bitter' and 'tasteless' were suggested in the instructions, within and between subjects studies demonstrated that a higher proportion of these words were used as descriptions than if their mention was carefully avoided. Prior presentation of primary stimuli, to elicit primary taste responses from subjects and so cause a self-suggestion effect, failed to work owing to the lack of primary response elicited. When these terms were given as limited response categories, some subjects broke these restrictions. It was concluded that instructions given to subjects are an important variable. The taste descriptions used are discussed and compared to those in prior studies. AS

## 46

The effect of duration of intervals between olfactory stimuli in the triangular method.

Frijters, J. E. R.

*Chemical Senses and Flavor* 2 (3) 301-311 (1977) [22 ref. En] [Inst. for Poultry Res. 'Het Spelderholt', Beekbergen, Netherlands]

In the sensory evaluation of foods and beverages the triangular method or triangle test is frequently used to study differences between samples. Because of its statistical character, the method does not prescribe a particular judgemental procedure to be followed when it is applied. For this reason

situational variables have been reported to influence results obtained by this method. In the present experiment, in the olfactory modality, the influence of inter-stimulus interval duration within a triangle was investigated. Over the range studied this variable was found to have no effect on the subjects' performance. A positional bias in favour of the middle stimulus has been reported [Food Technology (1950) 4, 434-439]. The results obtained did not support this observation. On the contrary a bias towards the left or right sample was only found when discrimination was impossible. AS

## 47

An aid to statistical evaluations of organoleptic panel results.

Blakesley, C. N.

*Lebensmittel-Wissenschaft und -Technologie* 10 (1) 21-23 (1977) [13 ref. En] [Nat. Food Res. Inst., S. African Council for Sci. & Ind. Res., PO Box 395, Pretoria 0001, South Africa]

A computer programme in FORTRAN is described to aid in the statistical evaluation of organoleptic panel results. The programme performs an analysis based on the nonparametric Friedman type rank statistics for a 2-way classification. If an overall difference is established for multiple samples at the chosen level of significance, the programme performs a series of Friedman tests with sample pairs to determine which sample are statistically different. The Friedman rank statistic method is more applicable to analysis of data from organoleptic panel tests for difference than to the more commonly used parametric analysis of variance methods. AS

## 48

Magnitude estimates of gustatory quality changes as a function of solution concentration of simple salts.

Cardello, A. V.; Murphy, C.

*Chemical Senses and Flavor* 2 (3) 327-339 (1977) [15 ref. En] [Univ. of Massachusetts, Amherst, Massachusetts, USA]

Concn.-dependent quality changes in inorganic salt solutions were investigated by obtaining quality reports, and magnitude estimates, from 4 subjects, of the taste of LiCl, KCl and NaCl solutions in the concn. range 0.004-0.050M; and of Li<sub>2</sub>SO<sub>4</sub> and K<sub>2</sub>SO<sub>4</sub> solutions in the concn. range 0.002-0.025 F [F = formal concn.]. Plots of the geometric mean of the magnitude estimates for each quality as a function of concn. confirmed the general findings of earlier investigators. In addition, differences found among the various studies were linked to differences in procedure which established variable levels of subject adaptation in the studies and permitted uncontrolled water tastes to affect the data. It was concluded that a concn.-dependent physicochemical change in the salt solutions combines with a water taste to produce the quality of low concn. inorganic salt solutions. The relative contribution of these 2 mechanisms to the overall quality of the solution at any concn. will depend on the procedures employed. AS



## 49

**Acidity and Brix to acid ratio, key determinants of orange juice quality.** (In 'The quality and detection of adulteration in citrus juices' [see FSTA (1977) 9 8H1276].) [Lecture]

Attaway, J. A.; Carter, R. D.; Fellers, P. J.; Moore, E. L.; Ting, S. V.

pp. 41-51 (1976) [9 ref. En, es] [Florida Dep. of Citrus, Lake Alfred, Florida, USA]

Flavour panel studies over a period of many yr by the Florida Department of Citrus and the University of Florida have shown that acidity and Brix/acid ratio are among the most important quality parameters for citrus juices. A recent study used 211 samples collected at random from all Florida Frozen Concentrated Orange Juice (FCOJ) processors during the 1972-1973 season. These samples represented more than 132 million 90-lb boxes of oranges processed into FCOJ during the season, or 80% of all Florida oranges processed during this period. These samples were reconstituted to 12.8 Brix and flavour scores and acid values determined. All of the samples were <0.98% acid (as anhydrous citric w/w) and >13 Brix/acid ratio. Experimental samples of Valencia orange juice were produced with acidity 0.75-1.63% and Brix/acid ratios of 6.9-16.9. Flavour panel evaluations of these samples showed highest scores for juices in the 13.5-15.5 ratio range. AS

## 50

**The feasibility of improving eating quality of table carrots by selecting for total soluble solids.**

Scheerens, J. C.; Hosfield, G. L.

*Journal of the American Society for Horticultural Science* 101 (6) 705-709. (1976) [23 ref. En]

[Agric. Res. Service, N. Cent. Region, USDA, Madison, Wisconsin 53706, USA]

Roots from 8 advanced generation breeding lines of carrot (*Daucus carota* L.) repeatedly selected for high or low total soluble solids content, and 2 selections of 'Imperator 58', one with high and one with low soluble solids, were evaluated for perceived sweetness and eating quality by taste panels. Most taste evaluations were made using the Quantitative Descriptive Analysis method. 2 breeding lines, 5158 and 5164, had high levels of solids (means averaging 10.4 and 10.8% respectively) but were downgraded in perceived sweetness in panel evaluations. The ranking of the other lines according to their mean preference scores for perceived sweetness was related to total soluble solids content. Bitter taste and harsh flavour characteristics were associated with 5158 and 5164. No perceived sensory differences were found between the high and low selections of Imperator 58 by a technological panel. A consumer preference taste panel, however, showed a slight preference for eating carrots from the high solids selection. The background constituents of carrot flavour appear to play an important role in the perception of sweetness at all levels of soluble solids. AS

## 51

**Flavours of tea - comparisons with coffee.**

Anon.

*British Food Journal* 79 (876) 6-8 (1977) [En]

The flavour of tea is discussed in qualitative terms, with reference to the production of black, green and 'Oolong' teas and to the compounds responsible for the tea flavour, notably esters and lactones, and polyphenolic compounds. The tannin content of black tea is between 7 and 15%, while coffee beans contain 9% before roasting, and half that afterwards. Terms used in professional tea tasting are briefly described. JRR

## 52

**[Qualitative evaluation of brandy.]** Die qualitative Bewertung von Weinbrand. I, II.

Anon.

*Alkohol-Industrie* 90 (6) 110, 115; (7) 132, 133 (1977) [De]

A critical discussion is given of the new regulations for sensory evaluation of brandies, which form part of the 2nd law for alteration of the legislation for wines in the Federal Republic of Germany. Aspects considered include: the relative importance of individual characteristics in the total quality score; problems with sensory evaluation; the potential of GLC analysis; the capability of the public to evaluate the quality of brandy, and difficulties with detn. of the intensity of 'wine' character of the brandy and its raw materials. TUB-IGB

## 53

**Taste panel techniques and statistics.** (In 'Criteria and methods for assessment of carcass and meat characteristics' [see FSTA (1977) 9 9S1612].) [Lecture]

Harries, J. M.

pp. 309-317 (1976) [17 ref. En] [Meat Res. Inst., Agric. Res. Council, Langford, Bristol, UK]

Problems with sensory evaluation of beef quality are discussed, with reference to: selection of carcass part for study; cooking method; sample presentation; panel size; characteristics to be evaluated; methods for quantifying the tasters' responses; and analysis of results. The effect of cooking conditions on the organoleptic properties are considered in detail, with special reference to texture. Problems of terminology of sensory characteristics are discussed; difficulties of international standardization are considered. AJDW

## 54

**Factors in beef quality.** (In 'Criteria and methods for assessment of carcass and meat characteristics' [see FSTA (1977) 9 9S1612].) [Lecture]

Joseph, R. L.

pp. 319-329 (1976) [25 ref. En] [Meat Res. Dep., An Foras Taluntais, Dunsinea, Castleknock, Co. Dublin, Irish Republic]

Brief details are given of a comparative study on the tenderness (evaluated by a taste panel or by a



Volodkevitch bite tenderometer) of longissimus dorsi from bulls and steers slaughtered at 16, 22, 24 or 25 months of age. A table of results is given. Within each age group, bull beef was tougher than steer beef. Age had no significant effect on tenderness. Correlations between taste panel score and Volodkevitch values were relatively low. In a further experiment, effects of chilling rate (fast, slow or medium) and carcass suspension (normal or tenderstretch) on the tenderness of beef from heifer carcasses were studied. Beef samples were evaluated after ageing for 2, 7 or 14 days at 0-2°C in a vacuum bag. A table of results is given. In general, toughness of the longissimus dorsi increased with increasing chilling rate, and was decreased by tenderstretch suspension. Tenderstretch treatment increased tenderness of the biceps femoris, semimembranosus and gluteus medius, toughened the psoas, and had no effect on the tenderness of the semitendinosus. Tenderness of most muscles improved during ageing. Only slight changes in juiciness, flavour, colour and cooking and drip losses were attributable to the variables studied. Tenderstretch suspension increased the sarcomere length of all muscles except the psoas. AJDW

## 55

[Drinking water. Determination of smell and taste.] Colombia, Instituto Colombiano de Normas Tecnicas  
*Colombian Standard ICONTEC 958*, 2pp. (1975) [Es]

Instructions are given for testing of drinking water samples for extraneous smells or tastes. The samples are heated to  $40 \pm 1^\circ\text{C}$  and left to cool before analysis. Taste and odour are evaluated by a panel of  $\geq 5$  persons; the sample under test is compared with a control odour- and taste-free sample prepared by distillation and activated C treatment. The test should be conducted in a chamber free from extraneous smells or draughts; panellists should not smoke or consume strongly-flavoured foods before the test. AJDW

## 56

On developing a colloquial vocabulary for the description of eating quality.  
Holland, D. A.

*Journal of the Science of Food and Agriculture* 28 (5) 436-442 (1977) [1 ref. En] [East Malling Res. Sta., Kent, UK]

A colloquial vocabulary for describing eating quality requires little training in its use and gives results that are readily understood by all. It is shown how such a vocabulary can be established, by analysing the frequency of usage of all words used in free descriptions to separate major from minor words, identifying and eliminating any synonyms or antonyms among the major words so as to distinguish between key-words (basic vocabulary) and alternative words (supplementary vocabulary), and finally, through group discussion, integrating the minor words. AS

## 57

[Testing the taste and flavour recognition capacity of taste panellists.]

Szabo, L.; Szabo, A.; Bende, E.

*Élelmézesi Ipar* 29 (12) 360-362 (1975) [8 ref. Hu, en, ru, de] [Megyei Élelmiszerellenőrző és Vegyvizsgáló Intézet, Kiss János ut 3, 9022, Győr, Hungary]

Procedures for testing the taste sensitivity of taste panellists (by evaluating their response to various concn. of sucrose, NaCl, citric acid and quinine sulphate solutions) are discussed, together with a method for testing their flavour recognition capabilities (by evaluation of their ability to identify a range of characteristically-flavoured substances). In practical trials, mean threshold concn. for the 4 primary tastes were: sweet (sucrose), 0.275%; sour (citric acid), 0.041%; salt (NaCl), 0.028%; and bitter (quinine sulphate), 0.00022%. These results are compared with literature data. Results are also given for a flavour-sensitivity trial with 28 panellists. All correctly identified acetic acid, ethanol and  $\text{NH}_3$ ; however,  $\leq 14\%$  failed to correctly identify herbs and spices. [From En summ.] AJDW

## 58

[Standardization of sensory evaluation of foods.] Szilágyi, J.; Katona, L.

*Élelmézesi Ipar* 29 (10) 303-306 (1975) [17 ref. Hu, en, ru, de] [MERT Minosegi Ellenőrző Rt, Münnich F u. 22, 1051 Budapest, Hungary]

The importance of standardization of procedures for sensory quality control in the food industry is discussed; Hungarian and foreign methods of sensory evaluation are reviewed. A programme for standardization of sensory evaluation of foods is proposed; recommended procedures for testing of the ability of panellists to evaluate the taste, aroma and colour of foods are described. [From En summ.] AJDW

## 59

[Proposals for alteration of the scheme for sensory evaluation of wines, in accordance with section 5 II of the Wine Law.] Vorschläge zur Änderung des Bewertungsschemas für die Sinnesprüfung nach Anlage 5 II der Weinverordnung.

Grosser, H.-U.

*Weinwirtschaft* 113 (16) 438-439 (1977) [4 ref. De] [Landwirtschaftskammer Rheinland-Pfalz, Bad Kreuznach, Federal Republic of Germany]

A proposed modification of the DLG (Deutsche Landwirtschaftsgesellschaft) scheme for evaluation of high-quality wines is described. The 20-point system used in the original scheme is retained but the relative number of points which may be awarded for clarity is reduced from 2 to 1, whereas the number of points which may be awarded for aroma is increased from 4 to 5. A verbal description is provided for each point score for each of the characteristics evaluated (colour, clarity, aroma, flavour). Min. overall point scores and min.

scores for each characteristic studied are specified for wines of each of the 6 quality grades (Qualitätswein, Kabinett, Spätlese, Auslese, Beerenauslese, Trockenbeerenauslese) considered. TUB-IGB

## 60.

Sensory analysis of coffee and coffee related products. (In '7th International Colloquium on the Chemistry of Coffee' [see FSTA (1977) 9 10H1670].) [Lecture]  
Roekel, J. van  
pp. 259-264 (1976) [En] [DEJ Int. Res. Co. BV, Utrecht, Netherlands]

This short review describes measuring instruments normally used in sensory analysis, and surveys the leading test methods used by experts and laymen for coffee and coffee products. AL

## 61

[A new scoring method for organoleptic evaluation of carbonated non-alcoholic beverages.]  
Molnar, P.; Ducsay, T.; Szabo, E.  
*Elelmzési Ipar* 30 (4) 121-126 (1976) [9 ref.  
Hu, en, de, ru] [Kozponti Elelmiszerellonörző és Vegyvizsgalo Intezet, Hermann Otto ut 15, 1022 Budapest, Hungary]

The international trend away from 100-point evaluation scales towards 20-point scales is discussed in relation to the 100-point scale specified in Hungarian standards. A new 20-point scale for evaluation of soft drinks is proposed, based on award of a max. of 5 points each for outward appearance, colour, aroma and flavour. AJDW

## 62

Taste intensity, pleasantness and quality of aspartame, sugars, and their mixtures.  
Moskowitz, H. R.; Dubose, C.  
*Canadian Institute of Food Science and Technology Journal* 10 (2) 126-131 (1977) [23 ref. En, fr]  
[MPI Sensory Testing Inc., 770 Lexington Avenue, New York, New York 10021, USA]

Panelists evaluated unmixed aqueous solutions of aspartame and 3 sugars (glucose, fructose, sucrose) at different levels as well as aspartame-sugar mixtures (by the method of magnitude estimation) for sweetness, pleasantness, and overall qualitative dissimilarity to sucrose solutions. Each unmixed sweetener produced sweetness functions conforming to power equations. Mixture sweetness of aspartame with all 3 sugars could be predicted from a linear combination of component sweetnesses. Pleasantness was approx. an inverted U or L shaped function of sweetness. Dissimilarity to sucrose 'flavour' was max. for mixtures which comprised substantial amounts of aspartame relative to the sugar. AS

## 63

Functional and organoleptic evaluation of low cholesterol egg blends.

Baker, R. C.; Darfler, J. M.  
*Poultry Science* 56 (1) 181-188 (1977) [2 ref.  
En] [Dep. of Poultry Sci., Cornell Univ., Ithaca, New York 14853, USA]

Studies were conducted on the functional properties of egg yolk/egg white blends with yolk/white ratios ranging from 1:1 (normal eggs) to 1:10. Protein and lipid contents of the blends were maintained at approx. normal levels by addition of corn oil and dried albumen. The various egg blends were tested by use for preparation of scrambled eggs, sponge cakes and baked custards. Tables of values are given for the taste panel scores for the scrambled eggs, cake height, vol., shear value and taste panel scores of the sponge cakes, and syneresis and sag values of the custards. The results show that the 1:4 blend gave the best-quality scrambled eggs. Sponge cake vol., centre height and overall eating quality decreased with decreasing proportion of yolk in the blend; acceptable cakes could be prepared with 1:1, 1:2 and 1:4 blends. The % syneresis of custards increased with decreasing proportion of yolk in the blend. End temp. during cooking was more critical for custards prepared from the blends than for those prepared from whole egg. The % sag was not influenced by blend composition for samples cooked to an end temp. of 85°C; at 88°C, % sag for the 1:1 blend was significantly less than that for the other blends. These results are discussed in relation to the potential for reduction of the cholesterol content of egg-based products. AJDW

## 64

Spices and condiments. Chillies. Determination of Scoville index.  
International Organization for Standardization  
*International Standard ISO 3513-1977*, 2pp.  
(1977) [En]

The method involves investigation, under defined conditions, of the greatest dilution at which the stimulus threshold of the pungent sensation of chillies (*Capsicum frutescens* L.) can be determined in the mouth or throat, starting with the most dilute solution (sucrose solution of an ethanolic extract). AL

## 65

Guide for tasting products of intense flavour.  
India, Indian Standards Institution  
*Indian Standard IS:7997-1976*, 5pp. (1976) [En]  
Price Rs5.00 [Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002, India]

Guidelines are given for sensory evaluation of food products which have an intense flavour or are too pungent to permit direct evaluation, by dilution with compatible food chemical substances or dispersion in neutral food carriers (e.g. a neutral soup or consomme for culinary herbs and spices, reconstituted dehydrated potato for dried onions etc., and white bread for ketchup, etc.). Auxilliary food products which may be used for palate cleaning between samples are listed. AL



## 66

Combination of a preference pattern with the triangle taste test.

Woodward, W. A.; Schucany, W. R.  
*Biometrics* 33 (1) 31-39 (1977) [6 ref. En, fr]  
[Dep. of Statistics, Southern Methodist Univ.,  
Dallas, Texas 75275, USA]

When dealing with the problem of obtaining information concerning consumer preferences for 2 competing brands of a product it is assumed that the consumers sampled can actually distinguish between the 2 brands. Often this is not so. A combination of the standard triangle test of sensory perception with a preference test to obtain information on the consumers ability to distinguish between 2 brands is proposed. Application of the statistical results obtained to taste tests with 2 brands of potato chips is discussed. AL

## 67

Flavor quality: objective measurement.

[Conference proceedings]

Scanlan, R. A. United States of America,  
American Chemical Society (Editor)  
ix + 117pp. ISBN 0-8412-0378-4 (1977) [many  
ref. En] Washington, DC, USA Price \$14.50

Papers presented at the symposium sponsored by the Division of Agricultural and Food Chemistry at the 172nd Meeting of the American Chemical Society, held in San Francisco, California on Sept. 1, 1976 were: Objective measurements of flavor quality: general approaches, problems, pitfalls, and accomplishments, by W. G. Jennings (pp. 1-10, 66 ref.); Correlation of odor intensities and vapor pressures with structural properties of odorants, by A. Dravnieks (pp. 11-28, 11 ref.); Flavor chemical mixtures - psychophysical analysis, by H. R. Moskowitz, C. N. Dubose & M. J. Reuben (pp. 29-44, 29 ref.); Structural and mechanical indicators of flavor quality, by Z. Vickers (pp. 45-50, 11 ref.); Relations between sensory and objective measurements for quality evaluation of green beans, by J. J. Powers, R. E. Bargmann & D. R. Godwin (pp. 51-70, 54 ref.); Measurement of flavor quality in apples, apple juices, and fermented ciders, by A. A. Williams, A. G. H. Lea & C. F.

Timberlake (pp. 71-88, 33 ref.); Objective measurements of the flavor quality of beer, by R. C. Lindsay (pp. 89-103, 43 ref.); and Use of regression models in objective flavor evaluation of processed orange juice during four seasons, by R. D. Carter & J. A. Cornell (pp. 104-109, 14 ref.). An index is included. This publication is No 51 in the ACS Symposium Series. AL

## 68

[Organoleptic analysis now and in the near future.]

Frijters, J. E. R.

*Voeding* 38 (7) 333-339 (1977) [Nl] [Inst. voor  
Pluimveeonderzoek 'Het Spelderhold',  
Beekbergen, Netherlands]

Problems of and developments in organoleptic analysis of foods are discussed generally under the

headings: organoleptic analyses from the practical viewpoint; organoleptic analysis and evaluation and psychophysics; scientific developments; and general developments. HBr

## 69

[Some physical methods used to control quality during organoleptic analyses.]

Gyurov, I.

*B'lgarski Plodove Zelenchutsi i Konservi* No. 1,  
16-17 (1977) [Bg]

Use of objective physical methods as an aid to organoleptic evaluation of foods during the quality control process is discussed. The methods covered include various colour-measuring instruments (e.g. spectrophotometers), penetrometers (for texture analysis) and viscometers (for consistency). STI

## 70

A comparison of pressure tests, acid levels, and sensory evaluations of overripeness in apples.

Blanpied, G. D.; Blak, V. A.

*HortScience* 12 (1) 73-74 (1977) [3 ref. En]  
[Pomology Dep., Cornell Univ., Ithaca, New York  
14853, USA]

Sensory evaluations of ripeness were made for 'McIntosh', 'Delicious', 'Golden Delicious', 'Idared', and 'Rome' apples (*Malus domestica* Borkh.) in 3 storage seasons. Samples rated overripe by the taste panel did not have flesh firmness values (3 seasons) or acid levels (1 season) which were consistently lower than apples of the same cultivar which were not rated overripe. AS

## 71

[Literature studies on factors influencing the intensity of sweetness, and sensory methods and sweetness of carbohydrates in fruit products.]

Ergebnisse von Literaturstudien hinsichtlich Einflussfaktoren auf die Intensität der Süßigkeit, sensorischer Methoden sowie Süßigkeit in Obst-Verarbeitungsprodukten vorkommender Kohlenhydrate. [Review]

Schaller, A.; Vogl, K.; Weiss, J.

*Confructa* 21 (4/5) 149-165 (1976) [104 ref. De, en] [Inst. für Lebensmitteltech., Univ. für  
Bodenkultur, Vienna, Austria]

This literature review is grouped into the following sections: sweet-tasting substances; intensity of sweetness (definitions, effects of chemical structure, solvent, temp., concn., viscosity, ratios of mixed sweeteners, effects of other basic flavours); sensory methods for testing the intensity of the basic "sweet" flavour (dilution, difference tests, ranking tests, rating tests, magnitude tests with a relative or absolute scale); and sweetness of some carbohydrates (sucrose, glucose, fructose, invert sugar), with tables showing sweetness relative to sucrose at 0.5-50% concn. RM



## 72

[Reduction of odour and taste of a commercial dried protein product recovered from potato vegetable water by heat coagulation.] Ergebnisse von Untersuchungen zur Verminderung von Geruch und Geschmack bei handelsüblichem, durch Hitzekoagulation aus Kartoffelfruchtwasser gewonnenen Protein-Trockenprodukt.

Knorr, D.; Höss, W.; Klaushofer, H.

*Confructa* 21 (4/5) 166-180 (1976) [61 ref. De, en] [Inst. für Lebensmitteltech., Univ. für Bodenkultur, Vienna, Austria]

A commercial dried protein product produced from potato juices by heat coagulation and used at present as animal feed was subjected to steam treatment, extraction with ethanol-diethyl ether-water, extraction with HCl and combinations of any 2 of these to reduce adherent flavour. The effects of the treatment on sensory quality were evaluated by a sensory test panel using a rating method with an unstructured scale. Statistical analysis revealed that best results were obtained with the organic solvent extraction, preceded or followed by steam treatment, or preceded by HCl. No significant difference in taste or smell of the product was observed between these 3 treatments. RM

## 73

[The problem of a panel test for olive oil.]

[Lecture]

Jacini, G.

*Rivista Italiana delle Sostanze Grasse* 54 (5) 199-201 (1977) [19 ref. It, en] [Sta. Sperimentale Oli e Grassi, Milan, Italy]

The adoption of standard internationally-accepted tasting methods would seem quite likely in the foreseeable future, in the interest of olive oil. Such a result could be obtained by combining conventional subjective tasting procedures with information obtained from some analytical methods. A standardization of this sort is being tested for > 1 yr at the Instituto de la Grasa, Seville, and in other fields, e.g. margarine. After surveying recent research and summarizing experimental programmes in other sectors of the food industry, the author recommends adoption of 2 analytical indices (viz. a volatile carbonyl number, and a phenol number) whose results should provide the necessary elements for introducing a standard tasting method. [See also FSTA (1977) 9 9N445.] RM

## 74

[Butter quality in 1976.]

Szücs, M.

*Tejipar* 26 (2) 31-33 (1977) [Hu, en, ru]

[Kereskedelmi Minőségellenőrző Intézet, Budapest, Hungary]

According to its moisture content, Hungarian butter is divided into the following classes: branded or dessert butter ( $16 \pm 1\%$  moisture); table butter ( $19 \pm 1\%$ ); and sandwich butter spread ( $29 \pm 1\%$ ). To

be put on the market, branded and dessert butter must have an organoleptic score of > 17 out of 20, and table butter and sandwich butter spread must score > 15. Out of a total of 320 samples examined in 1976, only 26 samples (20 table butter samples taken at the factory, 4 table butter samples taken at the retail outlet, and 2 dessert butter samples taken at the retail outlet) did not satisfy the quality standard. The average organoleptic score and moisture content, respectively, for the various types of samples examined was as follows: table butter (260 samples), 17 points, 18.8%; dessert butter (39 samples), 18 points, 15.8%; branded butter (12 samples), 18.5 points, 15.9%; sandwich butter spread (9 samples), 17 points, 28.6%. The quality of the parchment paper packaging used for table butter was not always satisfactory, and the storage life was not adequately indicated on the laminated foil packaging used for dessert butter and sandwich butter spread. ADL

## 75

[Taste sensitivity of dairy panel members.]

Rusev, Kh.

*Veterinarnomeditsinski Nauki* 14 (1) 62-67 (1977) [9 ref. Bg, ru, en] [Tsentrallen Vetmed. Inst., Sofia, Bulgaria]

136 members of panels of veterinary and dairy industry experts concerned with quality evaluation of milk, consisting of 84 women and 52 men aged 20-65 yr, were examined for sensitivity to salty (0.25% NaCl), sweet (1% sucrose), acid (0.02% tartaric acid) or bitter (0.004% caffeine) solutions in distilled water. It is concluded from tabulated results that 45% of the specialists were to a varying extent incapable of discriminating between the 4 basic tastes. Taste perception was more acute in non-smokers than in smokers and in young than in older subjects. Sensitivity was greatest for bitter and least for salty taste. SKK

## 76

Quality of commercial buttermilk as determined by gas chromatography, organoleptic and microbiological analyses. [Lecture]

Vasavada, P. C.; Washam, C. J.; Lillard, D. A.; Loewenstein, M.; Speck, S. J.

*Journal of Dairy Science* 60 (suppl. 1) 40-41 (1977) [En] [Univ. of Georgia, Athens, Georgia 30601, USA]

5 brands of commercial buttermilks were assessed organoleptically, microbiologically or by GLC after 0, 7 and 15 days storage at  $7 \pm 2^\circ\text{C}$ . Some correlations were found between organoleptic and GLC data. 40% of the samples were rated unacceptable or poor. [See FSTA (1977) 9 11P1719.] JMD

## 77

**Selection of Blue cheese quality descriptors by sensory evaluation. [Lecture]**

Godwin, D. R.; Washam, C. J.; Powers, J. J.  
*Journal of Dairy Science* 60 (suppl. 1) 42 (1977)  
 [En] [Univ. of Georgia, Athens, Georgia 30601, USA]

Blue cheeses from 6 commercial manufacturers were evaluated by a sensory panel of 25 judges. Data were analysed by cluster analysis and stepwise discriminant analysis. 12 terms permitted full classification of the samples: veiny, acceptability, white, curd appearance, pasty, yellow, crumbly, acid, soapy, and amount, appearance and acceptability of mould. [See FSTA (1977) 9 11P1719.] DMK

## 78

**Development of flavor compounds during ripening of Blue cheese. [Lecture]**

Aboshama, K.; Washam, C. J.; Vasavada, P. C.; Tolibia, J. R.  
*Journal of Dairy Science* 60 (suppl. 1) 57 (1977)  
 [En] [Univ. of Georgia, Athens, Georgia 30601, USA]

Sensory evaluation of wheels from Blue cheese loaves from 11 vats was made by a panel of 4 using a 10-point preference scale for flavour, appearance and acceptability. A 10-point intensity scale was used to evaluate the presence of various characteristic flavour components. GLC was performed on rind and centre samples separately, and tentative identifications were made. Additional analyses revealed concn. ranges of 0-0.44, 0-2.03 and 0.21-13 µg/g for diacetyl, acetoin and acetaldehyde respectively. [See FSTA (1977) 9 11P1719.] DMK

## 79

**Flavor acceptability of lipolyzed and non-lipolyzed process cheese with and without jalapeno peppers. [Lecture]**

Reddy, B. V.; Marshall, J. T.  
*Journal of Dairy Science* 60 (suppl. 1) 152-153 (1977) [En] [Mississippi State Univ., State College, Mississippi, USA]

Edam cheese lots were divided by acid degree value (ADV) into 3 ranges: (i) <2, (ii) 10-19, and (iii) >32; they were blended 1:1 with young (aged 3 months) non-lipolysed Cheddar (ADV <2), and combined with either 0 or 10% jalapeno peppers. Taste acceptability by 40 untrained panelists, using a scale of 1 (extremely better than a non-lipolysed reference sample R) to 9 (extremely inferior to R) were 4.8, 5.0 and 5.5 for (i)-(iii) with peppers and 4.8, 5.3 and 6.6 without peppers. [See FSTA (1977) 9 11P1719.] DMK

## 80

**[Qualitative characteristics of cultured milk.]**

Shidlovskaya, V. P.; Nasonova, L. M.  
*Molochnaya Promyshlennost'* No. 5, 24-26 (1977)  
 [Ru] [Vses. Nauchno-issled. Inst. Molochnoi Promyshlennosti, Moscow, USSR]

Samples of 6 different cultured milk products obtained at monthly intervals during Feb. 1974-Nov. 1975 from dairy plants in the Moscow region were tested organoleptically and for acidity, syneresis, protein and fatty acids. High-fat kefir incubated in containers and Tallin kefir exhibited high physical stability and contained increased amounts of volatile fatty acids, whilst the reverse was true for yoghurt-type products and acidophilin. Tallin kefir and acidophilin had higher contents of soluble nitrogenous compounds than had all other products, particularly those of yoghurt type. In organoleptic tests the sample were given generally 4-4.4 points, the kefir being rated lowest because of their consistency or insufficiently pronounced flavour. FL

## 81

**The eclipse method: optimizing product formulation through a consumer generated ideal sensory profile.**

Moskowitz, H. R.; Stanley, D. W.; Chandler, J. W.  
*Canadian Institute of Food Science and Technology Journal* 10 (3) 161-168 (1977) [7 ref. En, fr]  
 [MPI Sensory Testing Inc., 770 Lexington Avenue, New York, USA]

A method (Eclipse™) is presented for use in developing food product formulations. It is suitable for providing knowledge about product modification and optimization, gaps between a consumer estimated 'ideal' product and current formulations and is a quantitative method of approaching specific product formulations. Consumer ratings are obtained through magnitude estimation. Panel members generate data using a ratio scaling technique to indicate their perceptions of various attributes of the products. After calibration adjustment the data have the important property of possessing ratio properties. Using these data a computer programme devises an 'ideal' product conceived by the consumer. This product is used as if it were an experimental formulation using the same attribute and the same magnitude estimation. Regression equations are developed to predict which formulations correspond to the desired sensory perceptions. Reversing the equations allows the prediction of formulations that will produce the desired perceptions. AS

## 82

**[Evaluation of the capacity of taste panellists to discern tastes and flavours.]**

Bende, E.; Szabo, A.  
*Cukoripar* 29 (2) 57-59 (1976) [13 ref. Hu, en, de, ru] [Megyei Elelmiszerellenőrző és Vegyvizsgáló Intézet, Kiss Janos ut 3, 9022 Győr, Hungary]



**83**

[Testing the sensitivity of taste panellists to the four basic tastes.]

Szabolcs, L.; Bende, E.; Szabo, A.

*Hűtőipar* 22 (4) 100-103 (1975) [12 ref. Hu, en, ru] [Megyei Élelmiszerellenőrző és Vegyvizsgáló Intézet, Kiss János u. 3, Győr, Hungary]

**84**

Sensory analysis. Apparatus. Wine-tasting glass.

International Organization for Standardization

*International Standard ISO 3591-1977*, 3pp.

(1977) [En]

**85**

Guide for sensory evaluation of foods. III.

Statistical analysis of data.

India, Indian Standards Institute

*Indian Standard IS:6273 (Part III)-1975*, 51pp.

(1976) [En] Price Rs18.00 [Manak Bhava, 9

Bahadur Shah Zafar Marg, New Delhi 110002,

India]

See FSTA (1973) 5 9U626 and 627 for parts I and II.



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FAB 15

TASTE PANELS IN FOOD SCIENCE

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FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

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H. BROOKES

ASSISTANT EDITOR



## 1

[Experience with taste-panel testing of apples.]  
Erfahrungen zum Aussagewert von  
Geschmacksproben mit dem Apfel.  
Löhden, A.

*Erwerbsobstbau* 19 (5) 74-78 (1977) [De]  
[Trabener Strasse 55, 1000 Berlin(West) 33]

The results of taste panel tests carried out by groups of 15-20 students in successive years from 1973 to 1977 on a total of 6 dessert apple var. are reported. The tests were designed to assess the degree of acceptability to the consumer of the eating apple var. available on the German market, to determine the relative consumer preferences for different var. and detect deficiencies in eating quality which could be attributed to errors in the production and marketing arrangements. Each var. was rated on a five-point scale for taste quality either peeled or unpeeled, and the average of each season's results for a given var. was used to provide a basis for ranking that var. in relation to others. The results are presented for samples tested in the winter and in the spring, and differences between var. and variations from yr to yr are discussed. The effect of storage during the winter was shown to influence the relative performance. Seasonal differences were also dependent on the var.  
BDH

## 2

[Experiences and results of the 4th DLG Sensory Seminar.] Erfahrungen und Ergebnisse des 4.  
DLG-Sensorik-Seminars.  
Seibel, W.

*Getreide, Mehl und Brot* 31 (7) 190-193 (1977)  
[8 ref. De]

Details are given of the 4th DLG (Deutsche Landwirtschaft-Gesellschaft) sensory seminar. The 4 basic tastes, sweet, sour, salt and bitter, were exemplified by sucrose, citric acid, sodium chloride and quinine hydrochloride. For training purposes solutions of differing concn. and bread containing different concn. were made to test the taste panels' threshold levels. Bronze, Silver and Grand prizes were awarded to each of 18 groups of products ranging from bread to fine bakery goods. Grand prizes were awarded to 3.0% of the toast bread samples and 9.1% of the 'Berliner Landbrot' samples. [See FSTA (1977) 9 1M50 for the 3rd seminar.] JVR

## 3

The 2-thiobarbituric acid reaction, an objective measure of the oxidative deterioration occurring in fats and oils.

Sinnhuber, R. O.; Yu, T. C.  
*Journal of Japan Oil Chemists' Society [Yukagaku]*  
26 (5) 259-267 (1977) [72 ref. En] [Dep. of  
Food Sci. & Tech., Oregon State Univ., Corvallis,  
Oregon 97331, USA]

The chemistry and application of the thiobarbituric acid (TBA) test for oxidative rancidity of fatty foods is reviewed. The reaction of TBA with malonaldehyde to yield a red chromogen

with absorption max. at 532 nm is a quick, highly sensitive and reliable procedure for the measurement of oxidative rancidity, especially in systems with polyunsaturated fatty acids (more unsaturated than linoleate). Correlation with taste panel results is exceptionally good. The test can be directly applied without prior lipid extraction. Procedures have been developed to overcome the effects of interfering substances (e.g. carbohydrates, furfural compounds). A linear relationship was also observed between TBA and peroxide value of foods containing polyunsaturated fatty acids. RM

## 4

[Analysis and unification of terminology used to describe the external appearance of fish products.]  
Safronova, T. M.; Antonenko, E. V.; Kirienko, G. P.; Kotlyar, I. A.; Sadchikova, G. M.

*Rybnoe Khozyaistvo* No. 3, 68-75 (1977) [Ru]  
[Dal'nevostochnyi Tekh. Inst. Rybnogo  
Khozyaistva i Promyshlennosti, USSR]

Characteristics are given of the appearance of individual groups of fish products: frozen fish and frozen comminuted fish, salted fish, hot- and cold-smoked fish, dried fish, and canned fish. Limits are established for the individual components of outer appearance and their fluctuations. The proposed system is aimed at facilitating practical sensory evaluation. STI

## 5

Sensory quality control: practical approaches in food and drink production. [Conference proceedings]

United Kingdom, Institute of Food Science & Technology; United Kingdom, Society of Chemical Industry, Food Group  
138pp. (1977) [many ref. En] 105-111 Euston Street, London, UK Price £6

This publication, the proceedings of a joint symposium held in the University of Aston on 6-7 Jan. 1977, includes the following papers: Our senses and how we use them, by R. Harper (pp. 4-18, 28 ref.); Statistical concepts underlying sensory quality control, by W. A. Pridmore (pp. 19-27, 5 ref.); Sensory quality control: report on a survey, by H. G. Muller (pp. 28-36, 1 ref.); Sensory aspects of consumer product specifications, by D. Hicks (pp. 119-126); and Sensory testing as a management tool, by J. J. Wren (pp. 127-133). Discussion follows each of the sessions. A further 10 papers are abstracted separately in FSTA and are listed in the author index under United Kingdom, Institute of Food Science & Technology [Sensory Quality Control Symposium]. AL

## 6

Analysis of the sensory term 'nutty' and a list of compounds claimed to be nutty.

Clark, R. G.; Nursten, H. E.  
*International Flavours and Food Additives* 8 (5)  
197-201 (1977) [45 ref. En] [Atkin-Thompson  
Lab., Procter Dep. of Food & Leather Sci., Univ.,



Leeds LS2 9JT, UK]

A selection of compounds with nutty odours is listed and the organoleptic concept of 'nuttness' is described. Factors affecting individual differences in the concept of nuttness (including individual characteristics, training, and availability of stimuli), the difference in odour of nut-stimuli and the concept of nuttness are discussed. It is concluded that nuttness is a vague aroma description, representing a number of distinct aroma qualities. A list of compounds claimed to be nutty, together with their descriptions, is given. SP

## 7

[Use of mathematical/statistical data processing techniques in organoleptic quality control of foods.]

Anwendung mathematisch-statistischer Auswertverfahren in der sensorischen Qualitätskontrolle von Lebensmitteln.

Stahl, R.

*Zeitschrift für Lebensmittel-Technologie und -Verfahrenstechnik* 28 (5) 183-185 (1977) [4 ref. De]

Applications of statistical methods in organoleptic evaluation are discussed, with reference to use of sequential analysis for selection of test panel members, and use of variance analysis for evaluation of the significance of differences between sets of data. AJDW

## 8

**Sensory evaluation in tea buying and blending.** (In 'Sensory quality control' [see FSTA (1978) 10 2A81].) [Lecture]

Theobald, D. J.

pp. 69-72 (1977) [En] [Lyons Tetley Ltd., Greenford, Middx., UK]

A brief description is given of tea production, variation in tea characteristics with seasonal variations, etc., routine tea-tasting for buying and blending, and quantitative tea testing. AL

## 9

**Sensory control of ice cream quality.** (In 'Sensory quality control' [see FSTA (1978) 10 2A81].) [Lecture]

Spencer, H. W.

pp. 107-116 (1977) [4 ref. En] [Cent. Lab., J. Lyons & Co. Ltd., London, UK]

The system used for selecting and grading judges to assess Lyons Maid ice cream quality is described. The selection tests include identification of the 4 basic or primary tastes, ranking of sweetness, description of 20 odorants and discrimination between 2 slightly different flavours. Grade A assessors passed all 4 tests; grades B and C assessors passed 3 and 2 tests respectively. Training consisted of daily tasting of samples to develop sensory responses to appearance, flavour and texture. Techniques are also described to detect off-flavours in soft ice cream by tasting the fluid mix, and in ingredients (e.g. oils) by assessing them in milk. MEG

## 10

**Sensory analysis - vocabulary - I.**

International Organization for Standardization  
*International Standard ISO 5492/1:1977*, 5pp.  
(1977) [En, Fr]

This standard is the first in a series of lists of terms and their definitions in En and Fr relating to organoleptic analysis. AL

## 11

**[Wald's sequential analysis and its application to selection of judges for organoleptic testing.]**

Shirose, I.

*Boletim do Instituto de Tecnologia de Alimentos, Brazil* No. 50, 57-77 (1977) [4 ref. Pt, en] [Inst. de Tecnologia de Alimentos, Campinas, Sao Paolo, Brazil]

## 12

**Eating quality and composition of spent hens processed with or without immersion chilling.** Zenoble, O. C.; Bowers, J. A.; Cunningham, F. E. *Poultry Science* 56 (3) 843-845 (1977) [12 ref. En] [Dep. of Food & Nutr., Kansas State Agric. Exp. Sta., Manhattan, Kansas 66506, USA]

18 White Leghorn spent hens, obtained from a local producer, were processed according to commercial practices. 9 were cooked (2.5 h in boiling water) immediately (without chilling) and the remaining 9 were cooked after overnight chilling in ice slush. Cooked hens were hand-deboned and mechanically chopped. Yields, composition, and thiamin were determined; and an experienced taste panel scored tenderness, juiciness, and flavour. Bone-in cooked yield (71.5 and 72.8%) and edible yield (42.8 and 43.2%) were similar for the 2 treatments. % of protein, fat, and moisture of the chopped meat did not differ significantly for the 2 treatments. % of ash and thiamin were greater for meat from hens cooked without chilling. Meat from the birds cooked without chilling was less tender but juicier than meat from birds chilled overnight. Scores for chicken flavour did not differ significantly. AS

## 13

**Effect of selection on the ratings of taste panel assessors.**

Basker, D.

*Journal of Food Technology* 12 (6) 599-604 (1977) [9 ref. En] [Agric. Res. Organization, Div. of Food Tech., PO Box 6, Bet Dagan, Israel]

The combination of preference tests with difference tests in taste panel procedure is shown to be free from bias. This combination was used both to select assessors and also to obtain their assessments of segments and juice from fresh and stored oranges in triangle tests at the same session. The influence of the selection procedure on the results obtained is considered, and found to be only moderate. AS



## 14

**Acetaldehyde as an indicator of flavour intensity in yogurt.**

Robinson, R. K.; Tamime, A. Y.; Chubb, L. W. *Milk Industry* 79 (4) 4-6 (1977) [14 ref. En] [Dep. of Food Sci., Univ. of Reading, Reading, Berks, UK]

Yoghurt was made with the starters 'CH-1', 'Boll 3' (both from Chr. Hansen's Lab., Denmark) or 'RR' (from NIZO, Holland), and working cultures were prepared in 9% reconstituted skim milk incubated at 42°C and cooled at 5°C to give a 3:1 *Streptococcus/Lactobacillus* balance by a modified smear method [FSTA (1977) 9 3P432]. Experimental yoghurt in 5 oz cartons, prepared in a 16% TS mix under standardized conditions (42°C for 3-5 h) to an acidity of about 1% lactic acid, was assessed organoleptically by 25 students, all of Middle Eastern or Mediterranean backgrounds using standard methods of appraisal. Parallel samples from batches were analysed for 'acetaldehyde' levels against known acetaldehyde standards. Samples were scored on appearance, consistency and flavour and overall ratings were made of sample preferences. Results showed that 'CH-1' was much superior to 'Boll 3' and 'RR' (in that order). The 'acetaldehyde' contents ( $37.5 \pm 2.3$ ,  $27.6 \pm 1.3$  and  $10.4 \pm 0.3$  p.p.m., resp.) supported the organoleptic appraisal findings. The method devised could be used on a routine basis to some commercial advantage. TRA

## 15

**[The accuracy of the ordinary scoring procedure for ice cream.]**

Steinsholt, V. K.

*Meieriposten* 68 (21) 707-714; (22) 751-757 (1977) [No]

One ice cream sample was scored for flavour and odour by 124 judges, 166 samples were scored for appearance, odour, flavour and melt-down by 3 judges (with re-assessment if scores awarded by different judges for the same sample differed by more than one point), and 139 samples were scored for flavour and odour by 5 judges who were allowed to use half-points (but without re-assessment even if there were major differences). In all cases the samples were graded from 0 to 5. Generally, the observed frequency distributions of the scores were skew to the left, with the score 5 being used less frequently and the score 4 more frequently than expected from the normal distribution. Agreement between judges was poor for the score 5 but surprisingly good for the score 4. It was calculated that a difference of about  $\pm 1.5$  points between 2 average scores was significant at the 5% level when 22-34 samples were scored 6 times by 3 judges. When 20 samples were scored only once, differences of  $\pm 0.1$ ,  $\pm 0.5$  and  $\pm 1.0$ , resp., would not be significant at this level unless at least 502, 21 and 6 judges were used. It is concluded that great care must be taken in interpreting results of a single assessment unless a very large number of judges is used, and that the average score from several assessments is more reliable. ADL

## 16

**Respondent and response types in magnitude estimation scaling.**

Moskowitz, H. R.

*Food Product Development* 11 (4) 95-96, 98 (1977) [3 ref. En] [MPI Sensory Testing, Inc., New York City, New York, USA]

Magnitude estimation, a new sensory evaluation technique, is briefly considered. A typical sequence in introducing this technique to respondents is presented. The following groups of respondents are described: clear understanders, conservative responders, and nonunderstanders. Respondent reactions to magnitude estimation are discussed. VJG

## 17

**[Proposal for further development of a scheme for evaluation and description of fractions I to VI of Micko's fractional distillation of wine distillation products.]** Vorschlag zur Weiterentwicklung eines Bewertungsschemas für die Beurteilung und Beschreibung der Fraktionen I bis VI der fraktionierten Destillation nach Micko für die Erzeugnisse der Weindestillation.

Caspary, J.; Bülow, E. von

*Branntweinwirtschaft* 117 (15) 273-275 (1977) [De] [Landesanstalt für Lebensmittel-, Arzneimittel- & Gerichtliche Chem. Berlin, Kantstrasse 79, 1000 Berlin (West) 12]

A 30-point scheme for organoleptic evaluation of wine distillates on the basis of the flavour and aroma of fractions I-VI separated by fractional distillation according to Micko is described. Each fraction is awarded a score on a 2-point scale, on the basis of verbal descriptions of desirable and undesirable characteristics which may be present. Scores for individual fractions are then weighted to allow for differences in their relative importance in relation to wine distillate quality. The appearance of the fractions may also be evaluated. This scheme is discussed in relation to legal requirements for the 'wine-like' character of fractions of high quality wine distillates, and previously-published sensory evaluation schemes. AJDW

## 18

**Dehydration and processing problems of taro.**

Moy, J. H.; Wang, N. T. S.; Nakayama, T. O. M. *Journal of Food Science* 42 (4) 917-920 (1977) [12 ref. En] [Dep. of Food Sci. & Tech., Univ. of Hawaii, Honolulu, Hawaii 96822, USA]

A study was made of the feasibility of producing samples of taro (*Colocasia esculenta* L. Schott. var. *Lehua*) in compacted ration forms stable at 38°C for  $> 1$  yr, and to detect problems in dehydration and processing which would affect the palatability and storage quality of the dried products. Taro samples (5 mm thick slices) were freeze-dried, air dried and sun dried, then stored in polyethylene bags at 21, 38 and 60°C. Analysed monthly, most samples showed small changes in acidity, some



degradation in anthocyanins, some increase in moisture contents, and a rather large decrease in catalase activities. Taste panel evaluation of eating quality by the multiple comparison test resulted in scores averaging 4.5 for all the dried samples while the control received 5.5 (7-point Hedonic scale). Energy value was about 4.0 cal/g and gelatinization temp. was in the upper range as that of rice and slightly higher than wheat. Further assessments are being continued to determine if the physical form chosen was suitable for stability and acceptability tests, the preferred method of dehydration in terms of optimizing quality and energy requirements, and the effects of processing and storage on the eating qualities. IFT

## 19

**A language and procedure for the sensory assessment of Cox's Orange Pippin apples.**

Williams, A. A.; Carter, C. S.

*Journal of the Science of Food and Agriculture* 28 (12) 1090-1104 (1977) [13 ref. En] [Cider & Fruit Juices Sect., Long Ashton Res. Sta., Bristol BS18 9AF, UK]

The relation of consumer preference information to physico-chemical data, necessary to understand the causes of flavour quality in foods and beverages, requires detailed objective sensory descriptions to act as the link between the 2. This paper describes the development of a language and assessment procedure for evaluating the sensory attributes of the apple cv., Cox's Orange Pippin. Aspects of appearance, external and internal aroma, feel of the apple in the hand, taste, texture and after taste are covered, terminology where possible being defined in terms of standards or by analog with other foods. The problems associated with the sensory assessment of apples are also discussed. AS

## 20

**[Sweetening power of sugars.]**

Rapaille, -.; Walon, -.; Granier, -.; Simon, -.  
*Bios* 8 (10) 19-22 (1977) [Fr] [Centre de Recherche de CPC/Europe, Vilvorde, Belgium]

No instrumental methods are available to measure sweetness intensity and reliance is placed on taste panel ranking tests using 5 concn. of the solution under test vs. a sucrose solution of known concn. Essential requirements are: all solutions must be tested at the same pH (5.2) and temp. (20°C); solutions must be prepared 24 h before tasting; and tasters must be selected strictly and be capable of detecting 0.25% concn. differences around 10% sucrose. Data are presented showing the relative sweetness to sucrose (as %) of 9 sugars or polyols in 5, 10 or 15% concn. and of glucose syrups (acid and enzyme hydrolysis) and invert sugar. Important synergistic effects are noted between sucrose and dextrose, glucose syrups and invert sugar, whereby the sweetness of a mixture may be higher than the theoretical mean value for the constituents. Similar effects occur with invert

sugar; max. sweetness is attained at 50% inversion, followed by a reduction from 50 to 100% inversion. This is of practical importance in the production of non-alcoholic fruit drinks; thus at the low pH of 2.2-2.80, 75% of sucrose is inverted after 3 months, while pasteurization may produce 40-80% inversion. ELC

## 21

**Correlation of the flavor scores of vegetable oils with volatile profile data.**

Williams, J. L.; Applewhite, T. H.

*Journal of the American Oil Chemists' Society* 54 (10) 461-463 (1977) [20 ref. En] [Kraft, Inc., Res. & Development, 801 Waukegan Road, Glenview, Illinois 60025, USA]

Refined, bleached and deodorized soybean oil samples, fresh or aged for 5 wk in the light at 22°C, were evaluated by sensory panels to obtain the initial flavour score, and identical oils were analysed by volatile profile analysis using direct gas chromatography. The data were analysed and correlated using the computerized, stepwise multiregression technique. High correlation between the volatile profile data and flavour scores was found. The most significant peaks which were positively correlated with flavour score and those which were negatively correlated were obtained, and a prediction equation of flavour score was calculated from the volatile profile data. SP

## 22

**[Irradiation of haddock on board ship.] Zur Anbord-Bestrahlung von Schellfisch.**

Ehlermann, D.; Reinacher, E.; Antonacopoulos, N.

*Chemie Mikrobiologie Technologie der Lebensmittel* 5 (3) 81-88 (1976, publ. 1977) [33 ref. De, en, fr] [Inst. für Verfahrenstech., Bundesforschungsanstalt für Ernährung, Karlsruhe, Federal Republic of Germany]

After a brief review of published experience with irradiation of fish on board ship, taste panel results for fish caught on 2 separate voyages are presented. Haddock were gutted and washed as normal and then either packed in ice, or packaged in polyethylene pouches under vacuum and then packed in ice or irradiated (100-140 krad) in the polyethylene pouches and packed in ice. Cooked flesh was assessed by taste panels either on board ship or after landing. On a 9-point hedonic scale, a rating  $\geq 5$  was achieved by irradiated and unirradiated fish for the 1st 16 days' storage in ice; thereafter the irradiated fish received ratings of  $\geq 3$  for 28-35 days' storage but the unirradiated fish received ratings of  $< 3$  after 18-21 days. Contents of trimethylamine and total volatile bases are tabulated for the fish; the values generally correlated with the taste panel results. The increased shelf-life of fish which gained ratings of only 3-5 was not considered commercially useful. DIH



## 23

**The selection of judges for sensory testing.**  
[Conference proceedings]

Stone, H. (United States of America, Institute of Food Technologists, Sensory Evaluation Division) (Chairman)

*Food Technology* 31 (11) 50-67 (1977) [many ref. En]

3 papers are given which were presented at a symposium held during the 37th Annual Meeting of the Institute of Food Technologists in Philadelphia, Pennsylvania, USA, on 5-8 June 1977. The papers included: The selection and use of judges for descriptive panels, by K. Zook & C. Wessman (pp. 56-61, 9 ref.); and The selection and training of judges for discrimination testing, by L. P. Bressan & R. W. Behling (pp. 62-67, 6 ref.). A further paper is abstracted separately and listed in the FSTA author index under United States of America, Institute of Food Technologists, Sensory Evaluation Division [37th Meeting]. JA

## 24

**The number of assessors required for taste panels.**  
Basker, D.

*Chemical Senses and Flavor* 2 (4) 493-496 (1977) [7 ref. En] [Div. of Food Tech., Agric. Res. Organization, PO Box 6, Bet Dagan, Israel]

Samples of fresh Shamouti oranges were either examined immediately or stored for 30 day under commercial transport conditions. Samples of fresh and stored oranges were evaluated for quality using triangle tests, by taste panels. Assessors correctly identifying the 'odd' samples were selected for rating the samples on a 5 point scale from excellent to unacceptable. Results of trials did not indicate any general relationship between score variances and their means. The variances of all samples were pooled so that the number of valid scores required to obtain a mean with any desired s.e. can be calculated. It was concluded that the number of assessors required in taste panels is a function of the degree of difference expected amongst samples under investigation. For gross differences, 1 observer may be enough, but as the difference sought decreases, more observers are required. SP

## 25

**Specific anosmias to 5 $\alpha$ -androst-16-en-3-one and  $\omega$ -pentadecalactone: the urinous and musky primary odors.**

Amoore, J. E.; Pelosi, P.; Forrester, L. J.

*Chemical Senses and Flavor* 2 (4) 401-425 (1977) [45 ref. En] [W. Regional Res. Lab., USDA, Berkeley, California 94710, USA]

About 46% of human subjects are specifically anosmic to the odour of 5 $\alpha$ -androst-16-en-3-one, and about 9% are specifically anosmic to the odour of  $\omega$ -pentadecalactone. Odour threshold measurements on 33 representative steroids, synthetic musks and related compounds were made

with panels of normal observers and each of these var. of specific anosmias. The androstenone anosmia was most pronounced with steroid ketones in the androstane series and some isosteric analogs. It is suggested that this specific anosmia corresponds with the absence of a recently-suspected olfactory primary, the 'urinous' odour. The pentadecalactone anosmia was associated with a number of diverse but approx. isosteric synthetic musks. This specific anosmia delineates more clearly the boundaries of the 'musky' odour, whose probably primacy has long been recognized. Threshold measurements were made on mixtures of androst-16-en-3-one and pentadecalactone. The results depart little from the 'rule of additivity' for odour ratios up to 100:1, and suggest a quantitative interpretation for the anosmic defects measured with single compounds. AS

## 26

**Guide for selection of panel for sensory evaluation of foods and beverages.**

India, Indian Standards Institution

*Indian Standard IS 8140-1976*, 16pp. (1976) [En] Price Rs7.00 [Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002, India]

The standard prescribes sensory tests for screening, selection and training of panelists, arranged in increasing order of complexity of tasks and requiring increasingly higher levels of training. AL

## 27

**The human instrument in food science.**

Dürr, P.

*Lebensmittel-Wissenschaft und -Technologie* 10 (4) 232-233 (1977) [7 ref. En] [Swiss Fed. Res. Sta. for Arboriculture, Viticulture & Hort., 8820 Wädenswil, Switzerland]

Sensory analysis may be defined as the science of measuring and evaluating the properties of food products by  $> 1$  of the human senses. The science of human senses is called psychophysics. The results of psychophysical research are briefly reviewed. The relation between the question and the response in sensory testing is discussed. The motivation of a panelist for sensory testing is considered an important fact for obtaining good results. AS

## 28

**Some points of methodology in multidimensional data analysis as applied to sensory evaluation.**

Vuataz, L.

*Nestle Research News* 1976/77, 57-71 (1977) [19 ref. En] [Mathematics Sec., Nestle Corp. Res. & Development Cent., La Tour-de-Peilz, Switzerland]

The 1st part of this paper explains the use of principal component analysis in visualizing and interpreting data on sensory evaluation of food. The 2nd part discusses methodology developed in the Nestle Research Laboratory, and the 3rd part demonstrates the methods using results from an experiment with black chocolates. MEG



## 29

**Sensory evaluation or sensory measurement?**

Daget, N.

*Nestle Research News* 1976/77, 43-56 (1977) [18 ref. En] [Sensory Metrology Lab., Nestle Corp. Res. & Development Cent., La Tour-de-Peilz, Switzerland]

Sensory assessment of foods, based on psychology and physiology of perception, is discussed. Selection and training of a panel of assessors, and the different methods used to evaluate products (pair comparison tests, triangular tests, nominal, ordinal or interval scales, ratio scale, scale of numeration and multidimensional sensory evaluation) are described. MEG

## 30.

**[Sensory evaluation of foods with a rank order test.]**

Sensorische Beurteilung von Lebensmitteln mit einem Rangordnungstest.

Roth, H. R.; Speck, P.; Escher, F.; Solms, J.

*Lebensmittel-Wissenschaft und -Technologie* 10 (6) 305-307 (1977) [4 ref. De, en] [Inst. für Tierproduktion, Eidgenössische Tech. Hochschule, Clausiusstrasse 50, CH-8092 Zürich, Switzerland]

A ranking test was used to evaluate the colour, texture, flavour and stability of dried vegetables, produced using different treatments, and reconstituted in a 1% salt solution. Results were analysed statistically, using 't' test (null hypotheses),  $\chi^2$  test and analysis of covariance, to determine those treatments which contributed significantly to an improvement in quality of the samples tested. Equations used in the analyses are given. SP

## 31.

**Sharks score well in Texas taste surveys.**

Anon.

*Marine Fisheries Review, National Oceanic and Atmospheric Administration* 38 (7) 38 (1976) [En]

Tentative results of 4 taste tests conducted for the Texas Parks and Wildlife Department on the acceptability of sharkmeat are reported. In test 1, 128 testers were served broiled unseasoned pieces of (i) redfish, as control, (ii) sharpnose shark, (iii) bonnethead shark, and (iv) blacktip shark; scores averaged 4.3, 4.3, 3.9 and 3.6, resp. In test 2, 80 testers given small and large pieces of (iv), half of them soaked in water for 1.5 h before cooking, rated the large unsoaked piece highest (4.5) and the small soaked piece lowest (3.5). 80 testers given breaded and fried meat in test 3 gave (i) and soaked (ii) identical scores of 5.4, while unsoaked (ii) scored 5.2. In the final test, 64 testers were given 2 identical pieces of (iv), only one of which was said to be shark; the piece identified as shark received higher ratings and only 4 testers did not distinguish between the 2 pieces. In an attitude survey, 144 out of 199 respondents said they would

continue eating a good tasting fish when told it was shark meat; 23 would discontinue eating. Shark meat has firm texture, does not flake apart, there are no bones in the flesh and 65% of the animal is edible. AL

## 32

**Structure-activity relationships in human chemoreception. [Book]**

Beets, M. G. J.

xii + 408pp. ISBN 0-85334-746-8 (1978) [many ref. En] Barking, Essex, UK; Applied Science Publishers Price £25.00 [International Flavors & Fragrances (Europe), Hilversum, Netherlands]

This is the first book covering the structural aspects of human olfaction. It presents an interpretive review of the field set against theoretical concepts, which are dealt with in Part A of the book and include information on sensory processes and chemoreception. Part B deals with experimental aspects (the anatomy of the chemoreceptor systems, informational deficiencies, chirality, structural parameters, and indirect relationships and response intensity). The major categories of stimulants and their structural parameters are discussed in Parts C and D. The former deals with structures and modalities in olfaction (the musk modality in particular) and the latter with structures and modalities in gustation, covering the sweet and bitter modalities (carbohydrates, analogues and derivatives; amino acids, peptides and proteins; and other types) and sour and salty modalities. The book contains 18pp. of references and a 26pp. index. AL

## 33

**Weighting coefficients for the estimation of sensory threshold.**

Gacula, M. C., Jr.; Kubala, J. J.

*Chemical Senses and Flavor* 3 (1) 105-121 (1978) [17 ref. En] [Armour Res. Cent., Scottsdale, Arizona 85260, USA]

This paper discusses the detn. of difference thresholds (ED50) by least squares procedures. A table of weighting coeff. (W) to correct ED50 for chance probability was constructed for paired and triangle designs. The probability (P) of a correct judgement above chance for the paired design is  $P = 2p-1$ , where p is the actual proportion of correct responses. For the triangle design,  $P = (3p-1)/2$ . In both designs, P was weighted by  $W = y^2/pq$  where  $y^2$  is the squared ordinate of the normal curve based on P, and  $q = 1-p$ . An example of the use of the table of wt. is provided. AS

## 34

**[Evaluation of foodstuffs.] Otsenka produktov pitaniya. [Book]**

Mityukov, A. D.

96pp. (1977) [19 ref. Ru] Minsk, USSR; Uradzhai. Price 0.17r

Various systems and methods of organoleptic analysis of foods are discussed. The book, meant for specialists engaged in the food industry, trade



and agriculture, includes the following chapters: Marketing and the improvement of food product quality (pp. 5-8); Basis of organoleptic evaluation (pp. 8-17); Classification of methods of organoleptic evaluation of food products (pp. 17-30); Quality indicators and points scales for organoleptic evaluation of food products (pp. 30-66); and The unified system for quality evaluation of canned foods quality adopted by the CMEH countries (pp. 67-80). STI

### 35

**Effects of light and sound on parotid secretion and taste perception in response to sodium chloride.**

Pangborn, R. M.; Lundgren, B.; Drake, B.; Nilsson, U.

*Chemical Senses and Flavor* 3 (1) 81-91 (1978)

[24 ref. En] [Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

Salivary secretion in response to solutions of 1.6% NaCl was slightly, but not significantly, lower under red than under white illumination, and when wearing earphones which delivered intermittent 'kitchen' noise, or the monotonous noise of a siren. Gustatory responses from the same subjects to a 15-sample concn. series of NaCl indicated that neither discrimination nor perceived intensity of saltiness was significantly affected by the illumination or by the kitchen noise. Fitting of a smooth, sigmoid line to the group's discrimination data gave a value of 0.012% NaCl for the 75% correct level (50% above chance) and 0.08% NaCl for 100% identification. The subjects showed no systematic relationship among salivary flow rate, discrimination, or perceived intensity. Neither the light nor the noise resulted in significantly lowered responses in 10 out of 12 subjects in the salivation tests, nor in 45 out of 52 trials (13 subjects  $\times$  4 test conditions) in the taste tests. It appears that experienced subjects adapt well to systematic environmental distractions, which do not adversely affect their performance of simple perceptual tasks. AS

### 36

**Taste of methyl- $\alpha$ -D-mannopyranoside: effects of cross adaption and *Gymnema sylvestre*.**

McBurney, D. H.; Gent, J. F.

*Chemical Senses and Flavor* 3 (1) 45-50 (1978)

[10 ref. En] [Dep. of Psychology, Univ. of Pittsburgh, Pittsburgh, Pennsylvania 15260, USA]

The effects of cross adaptation and *Gymnema sylvestre* on the taste of methyl- $\alpha$ -D-mannopyranoside were studied. Results of taste panel tests showed that adaptation to quinine sulphate reduced bitterness and adaptation to sucrose reduced sweetness of methyl- $\alpha$ -D-mannopyranoside; but sucrose did not significantly reduce its bitterness. Treatment of panellists with *Gymnema* extract significantly reduced the sweet taste of sucrose and methyl- $\alpha$ -D-mannopyranoside, and caused a non significant increase in its bitterness. SP

### 37

**Sensory tests used in food product development.**

Brandt, F. I.; Arnold, R. G.

*Food Product Development* 11 (8) 56 (1977)

[En] [Dep. of Food Sci. & Tech., Univ. of Nebraska, Lincoln, Nebraska, USA]

Investigations were carried out to determine the sensory evaluation habits of food companies and to discover their methods of data handling and interpretation. 56 of the 62 major US food companies contacted participated in the survey. Results showed that the 3 evaluation methods most frequently reported were: (i) triangle test, used by 66% of the companies; (ii) hedonic scale scoring, 57%; and (iii) paired comparison, 55%. Multiple comparison, general preference, ranking, and degree of preference methods were used by approx. 33% of firms. Average frequency of (i) utilization was calculated at 25%, range 5-100%. The average level of (ii) use was 35.6%, range 5-100%. On average, (iii) utilization was 26.8%, range 5-90%. Of the 3 sensory evaluation methods discussed, (ii) had the highest average level of application within companies, thus it is the preference method most commonly used, and is well suited to consumer testing situations. Data interpretation is discussed. VJG

### 38

**Organoleptic evaluation of packaging materials.**

Robinson, L.

*CCB Review for Chocolate, Confectionery and Bakery* 2 (4) 3-5 (1977) [En]

The preparation and performance of organoleptic tests for examining foods for off-flavours acquired from packaging materials are discussed. Problems of taint by solvents from printing inks used on packaging materials are also mentioned. MEG

### 39

**Chilled seawater system for bulkholding sea herring.**

Hulme, S. E.; Baker, D. W.

*Marine Fisheries Review, National Oceanic and Atmospheric Administration* 39 (3) 4-9 (1977) [8 ref. En] [Northeast Util. Res. Cent., NOAA, Emerson Avenue, PO Box 61, Gloucester, Massachusetts 01930, USA]

The results of tests on bulk holding of herring in chilled seawater (CSW) indicated several advantages over normal industry practices. The bulk tank used was a single unit subdivided longitudinally to form 2 separate holds each of approx. 39.6 m<sup>3</sup> and able to carry 27 200 kg herring with ice and seawater. Optimum temp. of -1° to 0°C was reached by using a mixture of 7 t ice and 1000 gal seawater at 17°C, with a water:ice:fish ratio of 1:2:7. Fish were held for  $\leq$  32 h before unloading and quality examination; CSW herring was usually better than those taken from the forward hold without ice. Commercial plant



production data showed increased yields of fillets, roe and milt from CSW fish, which were firmer than control non-iced fish. Taste panel tests every 2-3 days of raw and cooked fish showed that after 5 days of iced storage CSW-held fish had considerably higher scores than control fish. Containers for holding herring were tested for their practical value in overland transport. Advantages included more rapid chilling of fish, ease of offloading and transport, maintenance of quality for overland transport and less overall handling. CSW could be re-used for dockside holding or overland transport. AL

## 40

**The detection of boar odour by a laboratory panel.**  
[Lecture]

Joseph, R. L.; McGloughlin, P. M.

*Proceedings of the European Meeting of Meat Research Workers* No. 23, F9:1-F9:16 (1977)

[En, Ru] [Meat Res. Dep., Agric. Inst., Castleknock, Co. Dublin, Irish Republic]

Laboratory staff were initially screened by testing their ability to detect the odour of the steroid (5- $\alpha$ -androst-16-ene-3-one) responsible for the characteristic boar odour; 6 judges were eventually selected. Fat samples were collected from boars, hogs and gilts which were killed weekly at a wt. of  $89.5 \pm 4.8$  kg. Samples of belly fat were singed with a soldering iron and sniffed by the judges, who used a 6-point scale, where 0 = no odour, 1 = unsure, 2 = weak, 3 = distinct, 4 = strong and 5 = very strong. The mean scores in boars were  $1.30 \pm 0.06$ , in hogs  $0.80 \pm 0.08$  and in gilts  $0.64 \pm 0.06$ . Boar odour with  $\geq 1.5$  points was encountered in 31% of boars, 3% of gilts and 8% of hogs. [See FSTA (1978) 10 8S1048.] STI

## 41

**Specification for tasting glass for liquid samples.**  
India, Indian Standards Institution

*Indian Standard* IS 7999-1976, 7pp. Price Rs5.00 (1976) [En] [Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002, India]

## 42

**[Physicochemical analysis of drinking water. Determination of odour.]**

Czechoslovakia, Urad pro Normalizaci a Mereni  
*Czechoslovak Standard* CSN 83 0520, Cast 32, 4pp. (1976) [Cs]

The method involves detn. of the type (e.g. 'earthy' 'faecal') and degree of odour subjectively, using a 5-point scale, and detn. of the measure of the odour from the organoleptic threshold concn. All tests are carried out at 20° and 60°C. HBr

## 43

**[Physicochemical analysis of drinking water. Determination of taste.]**

Czechoslovakia, Urad pro Normalizaci a Mereni  
*Czechoslovak Standard* CSN 83 0520, Cast 33, 2pp. (1976) [Cs]

The method involves a taste panel of 8-30 testers, using a 5-point scale. Tests are carried out with samples at 20-30°C. HBr

## 44

**[Organoleptic evaluation of foods.] L'évaluation sensorielle des denrées alimentaires. [Conference proceedings]**

France, Association pour la Promotion Industrie-Agriculture

168pp. (1976) [many ref. Fr] 35 Rue de General Foy, 75008 Paris, France; APRIA (London, UK; Food Trade Press Price £18.00)

Papers read at a 1-day Congress held in Paris in May 1976 include: Role of organoleptic analysis in analytical systems for foods, by F. Depledge (pp. 3-6); Physiological basis of organoleptic evaluation, by P. Macleod (pp. 7-33, 6 ref.); Methods and overall applications, by P. Davenas & J. Descombes (pp. 33-54); Coffee, a primary material, by R. Boulon (pp. 55-65); Control of wine tasting, by A. Vedel (pp. 67-76); Commercial practice - dairy products, by - Boisseau (pp. 77-86); A study on the improvement of organoleptic evaluation methods, by - Sauvageot (pp. 95-114, 11 ref.); Organoleptic evaluation and the consumer associations, by D. Simatos (pp. 115-121, 2 ref.); Needs of agriculture: problems of the quality of primary vegetable materials, by M. Deroo (pp. 127-137, 6 ref.); What does organoleptic evaluation mean to marketing executives?, by P. Lefevre-Utile (pp. 137-145); Organoleptic evaluation and distribution, by - Mouzay (pp. 147-152); and Conclusion, by - Salmon-Legagneur (pp. 161-168). Accounts of the discussion are included (pp. 87-93, 123-125 and 153-159). HBr

## 45

**Factors affecting panelists' perceptions of cured meat flavor.**

Price, L. G.; Greene, B. E.

*Journal of Food Science* 43 (2) 319-322, 336 (1978) [29 ref. En] [Dep. of Foods & Nutr., Univ. of Georgia, Athens, Georgia 30602, USA]

Several factors were tested for their ability to influence panelists' perceptions of flavour characteristics in cured meat. Factors found to influence panelists' judgments were score sheets, sample appearance and the co-presence of an oxidized or rancid flavour. Factors which did not affect panel scores significantly were type of product (i.e., ham vs. hot dogs vs. model system), internal processing temp. and amount of fat in samples. Evidence to date suggests that NaNO<sub>2</sub> may produce a stronger and more desirable cured product flavour but that curing without NaNO<sub>2</sub> would still produce a product that tasted 'cured' provided that NaCl was also included in the formulation. IFT

## 46

**Sensory analysis - vocabulary. II.**  
International Organization for Standardization  
*International Standard ISO 5492/II:1978*, 4pp.  
(1978) [En, Fr].

A further 14 terms and definitions are given.  
[See FSTA (1978) 10 2U98 for part I.] AL

## 47

**[Texture profile pattern of foods by profile terms and texturometer.]**

Yoshikawa, S.; Okabe, M.

*Report of the National Food Research Institute [Shokuryo Kenkyusho Kenkyu Hokoku]* No. 33, 123-129 (1978) [7 ref. Ja, en] [Nat. Food Res. Inst., Min. of Agric. & Forestry, Tokyo, Japan]

Terms proposed, with definitions, for the standardized description of the kinetic textural properties of foods have been translated from English to Japanese. The translated terms were used by a panel of 100 students to classify 90 Japanese foods by texture, and the results of this and of objective measurement of texture were compared. Close correlations were found between the two methods of description. Some typical Japanese foods have also been characterized using 8 kinetic character vectors on a circular diagram, yielding distinctive patterns. [From En summ.] JRR

## 48

**[Proposed scheme for organoleptic evaluation of ice cream.]** Vorschlag für ein Bewertungsschema zur sensorischen Prüfung von Speiseeis.  
Adam, R.

*Lebensmittel-Wissenschaft und -Technologie* 11 (3) 164-168 (1978) [7 ref. De]

[Bundesforschungsanstalt für Ernährung, Inst. für Chemie & Tech., Engesserstrasse 20, D-7500 Karlsruhe, Federal Republic of Germany]

An objective method for organoleptic evaluation of ice cream is proposed. It involves five 9-point scales for scoring colour, shape, odour, flavour and consistency, resp. The scoring system for each characteristic is complemented by a series of standard descriptive phrases, which have the same meaning for all panel members and have been evolved as a result of several thousand organoleptic evaluations of ice cream at the German Federal Research Institute for Nutrition, Karlsruhe. Samples are classed in 3 grades according to their score: Grade I (score 9-7), desirable properties; Grade II (score 6-4), satisfactory and suitable for the market; Grade III (score 3-1), unsatisfactory and unsuitable for sale. The following weighting factors are recommended for converting the individual scores to an overall score: 1 for shape and odour; 2 for colour; 3 for flavour and consistency. [See also FSTA (1970) 2 5A161.] ADL

## 49

**Stimulus - sensation - satisfaction.** New wing inauguration symposium, 16-18 September 1974, Göteborg, Sweden. II. Sensation aspects.  
[Conference proceedings]

Sweden. SIK-Svenska Livsmedelsinstitutet  
*SIK Rapport* No. 415, 58pp. ISBN 91-7290-050-4 (1977) [many ref. En]

The full text is given of the following 2 papers presented at this symposium: Human senses in action, by R. Harper (pp. 1-20, 26 ref.); and Quantitative methods in the study of subjective experience, by L. Sjöberg (pp. 21-56, many ref.). Abstracts are given of the following 2 papers: Instrumental and sensory data and their relations to preference data, by C. A. Akesson (p. 57, 3 ref.); and Sensory analysis in the food industry, by B. Sidh (p. 58). [See FSTA (1976) 8 10A574 and (1977) 9 9A573 for other sections of this symposium.] AJDW

## 50

**[Effect of age and sex of tasters on the results of taste-tests.]** Über den Einfluss des Lebensalters und Geschlechts von Prüfpersonen auf das Ergebnis von Geschmacksproben.  
Weyh, H.

*Brauwissenschaft* 31 (5) 121-128 (1978) [10 ref. De, en, fr] [Inst. für Chem.-tech. Analyse & Chem. Lebensmitteltech., Tech. Univ. München, 8050 Freising-Weihenstephan, Federal Republic of Germany]

Studies were conducted to evaluate effects of age and sex of taste panellists on their sensitivity to the 4 primary tastes. Solutions of NaCl, sucrose, quinine hydrochloride, caffeine, tartaric acid and citric acid were used as test substances. Tables of results are given. Women were found to have higher sensitivity to sweet and salt tastes than men; no significant sex difference was observed for bitter and sour tastes. At concn.  $\leq 250$  g/l, sucrose solutions are rated sweeter by women than by men. Trials were also conducted to investigate sex, age and body wt. effects on sensory evaluation of and preferences for carbonated soft drinks, and strongly or mildly-hopped beers. Tables of results are given, and discussed in detail. AJDW

## 51

**Flavour of fatty acids in relation to their physical state in solution.**

Roberts, R. T.; Clapperton, J. F.

*Journal of the Institute of Brewing* 84 (3) 157 (1978) [2 ref. En] [Brewing Res. Foundation, Nutfield, Redhill, Surrey, UK]

Lipids and lipid-like materials are present in solution immediately after addition to beer in a non-dispersed state. This state alters at a rate dependent on the individual substance until a dispersed state is reached. Tasting tests were performed on (i) control beer samples, (ii) beer samples containing octanoic acid or dodecanoic acid added at bottling



and (iii) beer samples containing octanoic acid or dodecanoic acid added immediately prior to tasting. Octanoic acid at 7.4 p.p.m. was perceived to have a stronger flavour in (iii) than in (ii) samples. Flavour scores for fatty acid intensity were made for (i)-(iii) containing 1 p.p.m. dodecanoic acid (using as reference a (ii) sample containing 1.5 p.p.m. dodecanoic acid). Scores obtained were for (i) 7.7, (ii) 10 and (iii) 15.3. No fatty acid was lost from beer by absorption to glass, and it is shown that intensity of fatty acid flavour is highest immediately after addition of fatty acid to beer; care must be taken to ensure dispersion of lipid-like materials in beer when conducting flavour tests. DIH

## 52

[Descriptive test method for determination of the flavour characteristics of chocolate mixtures.] Neue Ergebnisse der beschreibenden statistischen Prüfungsmethode bei der Ermittlung der Geschmackseigenschaften von Schokolademischungen. Randebröck, R. E.

*Deutsche Lebensmittel-Rundschau* 74 (6) 219-227 (1978) [5 ref. De, en, fr] [Univ. Hamburg, Holstenglacis 6, 2 Hamburg 36, Federal Republic of Germany]

Studies using the author's procedure for evaluation of the organoleptic properties of chocolate [FSTA (1978) 10 2K8] are described. Results are presented of comparative studies of the organoleptic properties of a milk chocolate, a plain chocolate and their 75:25, 50:50 and 25:75 blends, evaluated by a panel of 16-yr-old school children, and by an expert panel; differences between scores awarded by the 2 groups are discussed. Evaluation of the performance of taste panellists is also discussed. Correlations between selected pairs of the organoleptic characteristics studied are discussed, together with the relation between recipe and consumer acceptance. AJDW

## 53

Special sensory panels for screening new synthetic sweeteners. [Lecture]

Swartz, M. L.; Furia, T. E.

*Food Technology* 31 (11) 51-55, 67 (1977) [16 ref. En] [Food Services, Dynapol, 1454 Page Mill Road, Palo Alto, California 94304, USA]

Since human sensory panels are the only means of assessing sweeteners, it is vital that such panels give reliable and valid results. This paper discusses the screening of new synthetic sweeteners, consideration being given to: the importance of ensuring, prior to sensory evaluation, that the sweeteners are non-toxic; safety precautions taken during evaluation, e.g. no more than 8 ml of sweetener tasted at any one time expectoration of the sample; panel formation and training (training sessions involve familiarization with intensity-measurement techniques, taste-quality identification magnitude estimation by rating intensities of test solutions relative to a standard,

and use of score sheets); testing facilities and procedures (the test procedure involves tasting a reference, rinsing the mouth with water and then tasting a test solution); monitoring panel performance by statistical methods; determining the reliability and validity of the results; and panel motivation. [See FSTA (1978) 10 6A337.] JA

## 54

Predicting liquid food texture from fluid dynamics and lubrication theory.

Kokini, J. L.

*Dissertation Abstracts International*, B 37 (8) 4071:Order No. 76-23478, 230pp. (1977) [En] [Carnegie-Mellon Univ., 5000 Forbes Avenue, Pittsburgh, Pennsylvania 15213, USA]

A method was developed for analysis of subjective liquid food texture data and production of intrasensory correlations. The analysis showed 'thick', 'smooth' and 'slippery' to be important explanatory variables. 3 physical quantities were identified for assessment of these texture properties: shear stress for thickness, boundary friction force/site for smoothness and a function of both of these (representing total frictional force on the tongue) for slipperiness. Thickness was the dominant textural property of liquid foods, and a wide range of non-Newtonian liquids was studied to extend previously-published work. Smoothness was the 2nd most important descriptor of liquid food texture. All 3 sensory properties may be assessed by simple and inexpensive measurement of 2 physical properties. DIH

## 55

Psychophysical and psychometric approaches to sensory evaluation. [Review]

Moskowitz, H. R.

*CRC Critical Reviews in Food Science and Nutrition* 9 (1) 41-79 (1977) [83 ref. En] [MPi Sensory Testing Inc., New York, New York, USA]

Sensory evaluation has recently utilized the methods developed by psychophysicists and psychometricians, who seek to represent data in terms of various scales and mathematical formulations. This review covers the development of ratio scaling to develop relations between sensory and instrumental measures of food, the use of multivariate psychophysical procedures which relate a variety of physical variables to a single sensory response, and the use of multidimensional scaling to relate different sensory percepts to each other. Each of these approaches is nascent in applications to sensory evaluation, although the mathematics and formulations are very developed. Each approach gives the experimenter insights into subjective and objective correlations and the manner in which the panelist perceives relations among stimuli. The treatment of the reported literature for each approach follows the same course: necessary conditions for its application to sensory evaluation, experiences with model systems and real foods, and potential uses and limitations in sensory evaluation. AS



## 56

**Formulation and validation of two food preference instruments.**

Meadows, K. J.

*Dissertation Abstracts International*, B 37 (7) 3364: Order No. 77-753 (1977) [En] [Texas Woman's Univ., Denton, Texas 76204, USA]

A food preference list and a score card instrument were formulated. Validity was determined by a professional panel; responses showed a degree of validity of approx. 85%, with lower and upper confidence limits of 69.76 and 99.8%, resp. Test-retest procedures on 225 individuals were used as tests of reliability; results showed 86% overall agreement. The preference list is suited to information gathering and the score card to numerical data acquisition. DIH

## 57

**[Evaluation of sensory test panellists on the basis of their taste, smell and colour sensitivity.]**

Bende, E.; Six, L.; Szaboles, L.

*Élelmezési Ipar* 32 (5) 169-174 (1978) [12 ref. Hu, ru, en, de] [Megyei Minőségvizsgálati Intézet, Győr, Hungary]

The new Hungarian standard MSZ 7304/1 for testing of panellists was evaluated. Studies were conducted on the sensitivity of panellists to the 4 primary tastes (sweet (sucrose), salt (NaCl), sour (citric or tartaric acid) and bitter (caffeine or quinine)), their ability to differentiate between smells of 11 chemical compounds (NH<sub>3</sub>, benzaldehyde, butyric acid, diacetyl, acetic acid, amyl acetate, ethyl acetate, phenol, vanillin, coumarin and camphor), and their colour discrimination. Numerous tables and graphs of results are given. The results of taste tests showed that detection of 'bitter' gave the greatest problems; the water used for preparation of the solutions had a major influence. Many errors occurred in testing of concn. differences for the sweet and the bitter test solutions. Discrimination of smells was insufficiently selective; benzaldehyde and coumarin were commonly confused. Results for colour discrimination showed that accuracy of identification of red and green decreased and accuracy of identification of yellow increased with repeated testing. AJDW

## 58

**The CIA of the food world?**

Averill, G.

*Frozen Foods* 31 (7) 9, 22, 29 (1978) [En]

The work of the Food Products Intelligence Centre of Imperial Foods, based at Leamington Spa, is described. It produces a regular products bulletin for subscribing companies, arranges customer discussion and tasting panels for own and rival products, gives attention to regional tastes, operates a value-for-money rating system for various foods, etc. AL

## 59

**Chlorophenol taints in liquid milk.**

Harding, F.; Morris, J. L.

*XX International Dairy Congress E*, 117 (1978) [En] [Milk Marketing Board, Thames Ditton, Surrey, UK]

Levels of detection by taste of hypochlorite (200-500 p.p.m.) and phenols (Dettol 10-30 p.p.m.) are shown to be higher than chlorophenols (TCP 0.1-0.001 p.p.m.). TCP is a suitable standard for taste panel selection and training, and operators capable of detecting 0.1 p.p.m. by taste can be used for identifying sources of contamination. [See FSTA (1978) 10 10P1408.] AGP

## 60

**[Production of butter using the NIZO procedure.] Herstellung von Butter unter Anwendung des NIZO-Verfahrens.**

Kammerlehner, J.; Kessler, H. G.

*Deutsche Milchwirtschaft* 29 (14) 422-425 (1978) [De] [Süddeutsche Versuchs- & Forschungsanstalt für Milchwirtschaft, Weißenstephan, Federal Republic of Germany]

Using the procedure of the Netherlands Dairy Research Institute (NIZO) [see FSTA (1977) 9 6P880] with the NIZO culture concentrate and the NIZO 4/25 and Fr19 starters or a *Streptococcus cremoris*/Str. *lactis*/Str. *diacetylactis*/Leuconostoc *citrovorum* starter prepared in Weißenstephan, an extensive series of tests on production from sweet cream of butter with ripened-cream-butter characteristics has been carried out in the Weißenstephan Institute since Sept. 1976, buttermaking being in an Ahlborn 311 buttermaker. Organoleptic tests were carried out jointly with NIZO and the Netherlands Dairy Industry Quality Control Bureau (ZKB). It is concluded from results (calculated in detail) that the butter produced by the NIZO procedure contained 2-3 mg diacetyl/kg. was organoleptically equal to ripened-cream butter directly after manufacture and for several wk thereafter, but proved superior to it in longer storage; and that it was suitable for frozen storage and satisfied the requirements for quality butter (Deutsche Markenbutter). SKK

## 61

**[Statistical analysis for the relationship between gas chromatographic profiles of soy sauce flavour and sensory evaluation.]**

Aishima, T.; Nobuhara, A.

*Journal of the Agricultural Chemical Society of Japan [Nihon Nōgai Kagakkai-shi]* 51 (2) 65-74 (1977) [17 ref. Ja, en] [Cent. Res. Lab., Kikkoman Shoyu Co. Ltd., Japan]

The relationship between gas chromatographic profiles of soy sauce flavour and sensory scores were analysed using modified multiple regression analysis and stepwise regression analysis methods. In the analyses, the sizes of the gas

chromatographic peaks, expressed in both absolute and relative values were transformed with 3 kinds of functions, i.e. logarithmic, square root and arcsine. Sensory scores for 49 soy sauce samples (purely fermented, acid hydrolysed, and partly acid hydrolysed types) were recorded on a 5-point scale. Linear combinations between the objective and sensory methods were observed for every transformation, but those from logarithmically transformed absolute values showed the greatest accuracy among them. Thus it seems possible that the flavour quality of soy sauce could be estimated objectively using multiple regression models and gas chromatographic data. The multiple correlation coeff., and the coeff. of multiple determination attain 0.9 at the 15th and 25th of 54 steps, resp. These results suggest the importance of selecting the efficient peaks from the chromatograph spectrum for accurate estimation. The degree to which individual peaks contributed to the estimation of quality (for each transformation) varied considerably, indicating a complicated relationship between flavour quality and quantities of aroma compounds. [From En summ.] JRR

## 62

**Interpretation of the sensory significance of chemical data in flavour research. II. Statistical methods.**

Williams, A. A.

*International Flavours and Food Additives* 9 (3) 131-133 (1978) [43 ref. En] [Long Ashton Res. Sta., Bristol, UK]

This paper discusses various methods which have been used to correlate sensory and instrumental data. The techniques used to relate such data range from the purely visual comparison to statistical approaches relying on such multivariate techniques as multiple regression, discriminant, canonical and covariance analysis. [See FSTA (1978) 10 9T368 for part I.] VJG

## 63

[Raw and pressed hops. Methods of testing.]

Union of Soviet Socialist Republics,

Gosudarstvennyi Komitet Standartov

*Soviet Standard GOST 21948-76*, 12pp. (1976)

[Ru]

This standard, which partially supersedes GOST 8473-57, covers sampling and test methods for organoleptic assessment of raw and pressed hops, for microscopic detection of moulds, and for detn. of contents of foreign substances, moisture, ash,  $\alpha$ -acids, and sulphur anhydride. KME

## 64

[Sensory analysis. Examination of the gustative, olfactory and visual faculties of sensory testers.]

Hungary, Magyar Szabvanyugyi Hivatal

*Hungarian Standard MSZ 7304/1-76*, 9pp. (1976)

[Hu]

## 65

[Sensory testing methods. Preparatory room, test room.]

Hungary, Magyar Szabvanyugyi Hivatal

*Hungarian Standard MSZ 7304/2-77*, 4pp. (1977)

[Hu]



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H. BROOKES  
EDITOR





## 1

**Texture-taste interactions.**

Christensen, C. M.

*Cereal Foods World* 22 (6) 243-244, 256 (1977) [8 ref. En] [Monell Chem. Senses Cent., Univ. of Pennsylvania, 3500 Market Street, Philadelphia, Pennsylvania, USA]

The interaction of texture and taste in foods is relatively unexplored. Results of previous research are reviewed, which seem to indicate that taste stimuli are more easily perceived in liquids than in gels, and that sweetness is greater in gels which break down fastest in the mouth. No general effect of viscosity on taste intensity has been revealed within a limited viscosity range; over a wider range taste intensity fell with increasing viscosity for all 4 basic tastes. The relationship was a low order power function, with exponent values between -0.3 and -0.1. Results of new research, in which metered quantities of solution were given, and in which viscosities were measured for each taste concn. at shear rates present in the oral cavity, showed the intensity/viscosity relationship to have an exponent not significantly different from 0. Addition of NaCl or sucrose increases the perceived viscosity of solutions of controlled viscosity, to a degree relatively independent of taste intensity, approx. 0.1 log units, for both tastes. JRR

## 2

**[Studies on sensory evaluation. I. New modified Scheffe's method. I.]**

Hong, J.

*Journal of the Korean Agricultural Chemical Society* 20 (2) 210-220 (1977) [14 ref. Ko, en] [Gum-Bog-Ju Brewery Co. Ltd., Taegu, Korea]

Scheffe's method as modified by Ura is an efficient method commonly used in studying quality at a laboratory, but sometimes gives poor results if panels are not well controlled, or quality differences among samples are small. A new procedure, the 'new modified Scheffe's method 1' is described; experimental data shows that this method detects quality differences better than Scheffe's method as modified by Ura; it may also be used for training of test panels. KoSFoST

## 3

**[Studies on sensory evaluation. II. Trio paired comparison.]**

Hong, J.

*Journal of the Korean Agricultural Chemical Society* 20 (3) 270-278 (1977) [13 ref. Ko, en] [Gum-Bog-Ju Brewery Co. Ltd., Taegu, Korea]

For sensory evaluation trials with multiple samples and long test periods, quality differences between samples may be missed as a result of fatigue of panellists. To reduce the panellist's sense of psychological and physiological responsibility, a 'trio paired comparison' was developed; the 'new modified Scheffe's method 2' is proposed as a statistical method for this test. Problems with the trio paired comparison test are discussed, together with their solutions. [See preceding abstr. for part I.] KoSFoST

## 4

**[Studies on sensory evaluation. III. Pair comparison with a standard.]**

Hong, J.

*Journal of the Korean Agricultural Chemical Society* 20 (3) 279-284 (1977) [5 ref. Ko, en] [Gum-Bog-Ju Brewing Co. Ltd., Taegu, Korea]

Errors in multi-sample systems may result from the panellist's sense of psychological and physiological responsibility. A new method, the 'pair comparison with a standard' is described, with reference to a mathematical model. This method reduces test frequency and improves detection of quality differences; it may be used as a screening test for pre-selection of 4-5 samples. After screening, the trio paired comparison test should be used. [See preceding abstr. for part II.] KoSFoST

## 5

**[Studies on sensory evaluation. IV. New modified triangle test.]**

Hong, J.

*Journal of the Korean Agricultural Chemical Society* 20 (3) 285-291 (1977) [8 ref. Ko, en] [Gum-Bog-Ju Brewing Co. Ltd., Taegu, Korea]

A new statistical method, the 'new modified triangle test', is designed to test the null hypothesis based on the result of evaluating the sample size  $t$ , where  $t \geq 3$ , using the triangle preference test. The new modified Scheffe's method [see preceding 3 abstr.] may be used for appraisal of the new modified triangle test. KoSFoST

## 6

**[Tasting trials complete cultivation tests.]**

Degustationen ergänzen die Anbauprüfungen.  
Genenger, M.

*Ernährungs-Umschau* 25 (1) B1-B3 (1978) [De]  
[Landwirtschaftskammer Rheinland, Versuchsanstalt für Obst- & Gemüseanbau Auweiler, Gartenstrasse, 5000 Cologne 71, Federal Republic of Germany]

The value of conducting tasting trials as part of the trial of a new var. of fruit or vegetable is described. A taste trial may also indicate whether a particular food processing operation is suitable for a new var. As an illustration, taste panel results for 19 var. of green-hulled and 9 var. of yellow-hulled dwarf bean are tabulated for freezing or preservation in jars. Some var. are suitable for freezing, others for bottling, and some (e.g. var. Rocbrun) performed poorly in both processes. DIH

## 7

**High-fiber bread.**

Volpe, T.; Lehmann, T.

*Bakers' Digest* 51 (2) 24-26 (1977) [En] [American Inst. of Baking, Chicago, Illinois, USA]

$\alpha$ -cellulose was used as a replacement for 10% of flour in a 70/30 sponge-dough bread formulation, resulting in a loaf of approx. 5% fibre by wt. Under the particular preparation conditions, the cellulose-containing bread required 10% more water



than controls, and finished loaves contained 39.0% moisture, compared with 34.62% for controls. The overall quality of cellulose-containing bread was generally lower than controls, particularly with respect to loaf vol., but was rated acceptable. Colour of cellulose-containing loaf crumb was slightly darker; and the crumb was slightly firmer initially, though compressibility differences were insignificant after 7 days. Taste tests indicated significant differences in organoleptic assessment ( $P < 0.01$ ) but there were no significant differences in acceptability. JRR

## 8

### A linear programming technique to optimize bread quality.

Graven, M.

*Dissertation Abstracts International*, B 38 (1) 126-127: Order No. 77-13795, 172 pp. (1977) [En] [N. Dakota State Univ., Fargo, N. Dakota 58102, USA]

The Hunter Color Difference Meter, Gardner Digital Color Difference Meter, and Agtron Reflectance Spectrophotometer were investigated for use in bread crust and crumb colour evaluations. The relation between visual colour and photoelectric measurements of crust and crumb colour was studied. Crust and crumb colour maps were developed for each instrument. Statistical analysis showed a high correlation between visual and instrumental scoring for crust and crumb colour. The Instron Universal Testing Machine was investigated for use in objectively evaluating grain and texture of bread crumb. The firmness value, calculated from compressibility measurements, showed a statistically significant correlation with sensory grain and texture scores. The continuous breadmaking process was studied to determine the contribution of the processing parameters of developer temp., broth time, and developer speed to the quality of the bread produced. The developer speed exhibited the most significant effects on the quality of continuous-mix bread, while the broth time exhibited the least effects. The possibility of optimizing the processing parameters of the continuous bread process, by use of linear programming (LP), for the production of bread of max. quality was investigated. Bread was processed using a range of processing conditions and evaluated by both sensory and instrumental methods. Solutions to the LP matrices identified the conditions required for processing optimum quality continuous-mix bread. AS

## 9

### Recent developments in rice research.

Juliano, B. O.

*Cereal Foods World* 22 (7) 284-287 (1977) [17 ref. En] [Int. Rice Res. Inst., Los Banos, Laguna, Philippines]

The tests employed during a breeding programme to improve rice grain quality are briefly outlined, and quality factor objectives are described. Production of a grain with intermediate amylose content and preferably an intermediate gelatinization temp. is desired. Increase in protein content is only possible to a limited extent if yields are not to be depressed; an increase of 1.8 percentage points has been achieved. The eating quality is not adversely affected by an increase in protein. JRR

## 10

### [German Agricultural Society's (DLG) testing of butter in retail packs in 1977.] Ergebnisse der DLG-Qualitätsprüfung 1978 für Butter in Verbraucherpackungen.

Bötel, W.

*Deutsche Milchwirtschaft* 29 (33) 1153-1155 (1978) [De]

153 samples of butter produced by dairy plants throughout the Federal Republic of Germany were submitted for testing in Oldenburg in May 1978. 121 samples were ripened-cream butter, 27 sweet-cream butter and 5 'other butters'. Packaging was mainly in Al foil (118 samples), followed by plastics-coated wrappers (27), parchment paper (2) and cups (4); for 2 samples the packaging material was not specified. In organoleptic tests, 34.7% ripened-cream butters and 85.2% sweet-cream butters were given the highest award, 38.0 and 11.1% silver medal and 25.6 and 3.7% bronze medal; 'other butters' were given silver and bronze medals. Results of the evaluation of the packages, and of laboratory tests for butter hardness (resistance to cutting) are presented. [See *Deutsche Milchwirtschaft* (1977) 28 (33) 1075-1077 for 1977 results.] FL

## 11

### Segmentation of fresh pork loins into quality groups.

Davis, G. W.; Smith, G. C.; Carpenter, Z. L.; Freund, R. J. *Journal of Animal Science* 46 (6) 1618-1625 (1978) [21 ref. En] [Texas Agric. Exp. Sta., College Station, Texas 77843, USA]

Marbling, colour, firmness and muscle structure scores were assigned to 403 wholesale pork loins. Multiple regression equations that combined quality scores assigned to the muscle surfaces at the 10th rib, blade end or sirloin end accounted for 31.9, 22.2 or 21.0%, resp., of the observed variability in overall palatability scores. Quality scores were grouped to create 5 levels each of marbling, colour and firmness. Response surface techniques were used to identify combinations of factor levels (scores for marbling, colour and firmness) which would yield max. response in the dependent variable (overall palatability score) and to assign loins to 'Superior', 'Acceptable' or 'Inferior' palatability groups. Stratification systems based on quality indicator scores assigned at the 10th rib, blade end or sirloin end correctly assigned 53, 47 and 46% of the loins to the appropriate palatability group (Superior, Acceptable or Inferior). Fresh pork loins can be segmented into expected palatability groups by use of quality indicator scores assessed at the sirloin end of the wholesale loin (commercial grading application) or at the 10th rib (carcass contests, breed certification programmes) with approx. 50% success. AS

## 12

### Assessment of taste panelists.

Gormley, T. R.; Sherington, J.

*Irish Journal of Food Science and Technology* 2 (1) 59-66 (1978) [6 ref. En] [An Foras Taluntais, Kinsealy Res. Cent., Malahide Road, Dublin 5, Irish Republic]

The tasting performance of 81 tasters who took part in 58 rank type laboratory taste panels on a range of 19



products was studied by examining correlation coefficients, termed PO correlation coefficients, between personal rank scores and the overall rank score for each panel. The tasters who had the highest PO correlation coefficients over a number of panels can be considered as above average tasters. There was incomplete agreement between the rating of tasters as determined by this method and that obtained by screening the panelists with sweet, sour, salt and bitter solutions. AS

### 13

#### **Taste assessment of individual salts in water. Methodology and preliminary findings by a selected national panel.**

Zoeteman, B. C. J.; Grunt, F. E. de; Köster, E. P.; Smit, K. G. J.; Punter, P. H.

*Chemical Senses and Flavor* 3 (2) 127-139 (1978) [16 ref. En] [Nat. Inst. for Water Supply, Voorburg, Netherlands]

The taste rating, according to a specially designed taste rating scale, of NaCl, MgCl<sub>2</sub>, CaCl<sub>2</sub>, NaHCO<sub>3</sub>, Mg(HCO<sub>3</sub>)<sub>2</sub>, Ca(HCO<sub>3</sub>)<sub>2</sub>, Na<sub>2</sub>SO<sub>4</sub>, MgSO<sub>4</sub> and CaSO<sub>4</sub> solutions in double-distilled water was determined by a carefully selected panel consisting of 52 subjects. Increasing concn. of the 9 salts resulted in quite different taste rating curves, with optima for NaHCO<sub>3</sub> and CaSO<sub>4</sub>. The lowest cation concn. resulting in a mean taste rating, corresponding with an objectionable taste for the average panel member, was tentatively defined for Mg, Ca and Na as 10, 100 and 175 mg/l., resp. The anions seem to exert a masking effect on the sensory detectability of the cations. Standards for drinking water in relation to prevention of objectionable water taste should primarily define values for the cations and not for anions such as Cl under normal pH conditions. AS

### 14

#### **Sensory measurement: the rational assessment of private sensory experience - its use, limitations and prospects.**

Moskowitz, H. R.

*Technical Quarterly, Master Brewers Association of America* 14 (2) 111-119 (1977) [28 ref. En] [MPI Sensory Testing Inc., New York, USA]

This paper presents a broad spectrum of experimental results in psychophysics, the science that relates sensory perception to physical measurements. For the 1st time, psychologists, food scientists and applications engineers can take subjective measures, and relate them to physical variations, by meaningful equations. Such equations permit predictions about expected sensory responses to product modifications. They can guide the product developer in optimizing the product to achieve max. sensory acceptance, or in minimizing cost to produce the product at an acceptable sensory level. AS

### 15

#### **Smell illusions and suggestion: reports of smells contingent on tones played on television and radio.**

O'Mahony, M.

*Chemical Senses and Flavor* 3 (2) 183-189 (1978) [17 ref. En] [Dep. Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

During a television show about the chemical senses, viewers were played a tone which, they were told, was of the same frequency as the frequency of vibration of molecules of an odorous substance. They were told that the tone would cause them to experience a smell that was a pleasant country smell. Viewers responded with many reports of smells including 'hay' and 'grass' as well as reports of attacks of hay fever and sneezing. The experiment was repeated on the radio with 2 separate tones and a period of silence explained as an ultra high frequency tone which was not consciously audible but still having effect. 'Smell' responses were obtained for all 3 tones. Several explanations are discussed, including 3 possible suggestion mechanisms; criterion change by suggestion; signal generation by suggestion; and suggestion of verbal framework. AS

### 16

#### **The perception of odor intensity: physics or psychophysics. II.**

Wright, R. H.

*Chemical Senses and Flavor* 3 (2) 241-245 (1978) [7 ref. En] [6822 Blenheim Street, Vancouver V6N 1R7, Canada]

[See FSTA (1978) 10 8A464 for part I.]

### 17

#### **Comparison of odours directly and through profiling.**

Dravnieks, A.; Bock, F. C.; Powers, J. J.; Tibbetts, M.; Ford, M.

*Chemical Senses and Flavor* 3 (2) 191-225 (1978) [14 ref. En] [IIT Res. Inst., Chicago, Illinois, USA]

Odour qualities of 10 odorants were compared by 50 panelists of 4 cooperating laboratories. The odorants were: acetophenone, anethole, 1-butanol, carvone, p-cresylmethylethèr, cyclohexanol, 1-heptanol, 1-hexanol, phenylethanol, and pyridine. In 1 method, dissimilarity was scored directly on a 7-point scale; results from different laboratories correlated at  $P < 0.001$ , and identical odours yielded scores well-discriminable from those for non-identical odours. In another method, odours were compared indirectly, by comparing their edited multidimensional profiles obtained using Harper's scale expanded to 136 descriptors; mean profiles from different laboratories correlated at  $P < 0.05$  in 97% of cases. To eliminate semantic effects, a  $\chi^2$  statistic was applied to the individualized descriptor usage counts, providing a dissimilarity measure,  $D_{CHI} = \ln(\text{coeff. of association})$ ; its value from different laboratories correlated at  $P < 0.001$ . However, a distinct discrimination of identical odours was possible only after adding some descriptors specific to alcoholic odours.  $D_{CHI}$  and dissimilarity scores related curvilinearly, but a linearity ( $r = 0.88$ ) resulted for  $D_{CHI}$  vs. score/(8-score). Thus,  $D_{CHI}$  derivable from sufficiently articulate multidimensional profiles adequately substitutes for the direct dissimilarity scores; in addition, profiles indicate the nature of the dissimilarity. Fortran programs for the profile analyses are given. AS



## 18

An application of gustatory psychophysics in Antarctica.

Gregson, R. A. M.

*Chemical Senses and Flavor* 3 (2) 141-147 (1978) [5 ref. En] [Univ. of Canterbury, Christchurch 1, New Zealand]

Measures of gustatory perception were made on a team of 9 men who wintered-over in Antarctica between Dec. 1976 and Oct. 1977, using an unpublished test devised for hospital use in screening patients with metabolic disorders. Taste acuity was measured using glucose solutions of 0.35, 0.70, 1.40 and 2.80% concn. in g/ml and citric acid concn. of 0.0012, 0.0025, 0.0050 and 0.0100% in g/ml. Results of the tests, presented in histograms, show perceptual stability, with a slight improvement at the end of the wintering-over period for the 9 men. It is concluded from the results, that there is no evidence to support the notion of a deterioration in taste acuity. SP

## 19

Computing exact probabilities in sensory discrimination tests.

Stone, H.; Sidel, J. L.

*Journal of Food Science* 43 (3) 1028-1029 (1978) [15 ref. En] [Tragon Corp., PO Box 783, Palo Alto, California 94302, USA]

Several published tables used for the detn. of significance in a discrimination test were found to be inconsistent. It is recommended that exact probabilities be computed using a table of the cumulative binomial distribution, or approximate probabilities using either the adjusted  $\chi$ -Square or the normal deviate formula. IFT

## 20

Expanded statistical tables for estimating significance in paired-preference, paired-difference, duo-trio and triangle tests.

Roessler, E. B.; Pangborn, R. M.; Sidel, J. L.; Stone, H.

*Journal of Food Science* 43 (3) 940-943, 947. (1978) [12 ref. En] [Dep. of Mathematics, Univ. of California, Davis, California 95616, USA]

2 sets of expanded tables were compiled for use in determining significance in paired-difference and triangle tests (1-tailed) and in paired-preference tests (2-tailed). 1 set of tables lists the number of correct responses (or agreeing judgments) for trials ranging from 7 to 100, at  $P < 0.05, 0.04, 0.03, 0.02, 0.01, 0.005$  and  $0.001$ . These tables are convenient for a quick estimate of significance of laboratory sensory data as well as consumer responses. The 2nd set of tables gives the probabilities of obtaining a given number of correct (or agreeing) judgments in trials ranging from 5 to 50. These probability tables provide a more precise estimate of significance, which may be needed in more critical research or in making decisions of considerable importance. Some examples are given, with guidelines for the proper use of these tables and the interpretation of significance based upon them. [See also preceding abstr.] IFT

## 21

Physics in textural properties of foods. [Lecture] Sherman, P.

*International Congress of Food Science & Technology - Abstracts* p.51 (1978) [En] [Dep. of Food Sci., Queen Elizabeth Coll., Univ. of London, Campden Hill Road, London W8 7AH, UK]

Physical aspects of food texture are discussed, together with the lack of a close relationship between organoleptically evaluated texture and the results of conventional non-destructive objective tests. Instrumental and sensory evaluation of viscosity, hardness and stickiness is discussed, with reference to physical principles involved, and the effects of saliva on these textural characteristics. [See FSTA (1979) 11 2A60.] AJDW

## 22

Interrelationship between instrumental methods and sensory assessment for food texture. [Lecture]

Kapsalis, J. G.; Moskowitz, H. R.

*International Congress of Food Science & Technology - Abstracts* p.53 (1978) [En] [US Army Natick R&D Command, Natick, Massachusetts, USA]

Aspects considered included: the potential for development of instruments calibrated in terms of human sensory response; the importance of time-dependence of textural characteristics evaluated both objectively and subjectively; relations between sensory characteristics and results obtained with empirical instruments; rheological analyses in designing of test probes; fracture phenomena in relation to texture; the magnitude estimation procedure; and uses of ad hoc equations. [See FSTA (1979) 11 2A60.] AJDW

## 23

Method for the measurement of phenols associated with the smoky-hammy flavor defect of cocoa beans and chocolate liquor.

Lehrian, D. W.; Keeney, P. G.; Lopez, A. S.

*Journal of Food Science* 43 (3) 743-745 (1978) [8 ref. En] [Dep. of Food Sci., Pennsylvania State Univ., University Park, Pennsylvania 16802, USA]

A procedure for extraction of flavour components from cocoa beans and chocolate liquor with acetonitrile is described. After removal of interfering substances, phenolic compounds in the extract are reacted with N,2,6-trichloro-p-benzoquinoneimine to form coloured indophenols. A high correlation (0.89) was found between the concn. of phenols and the results of taste panel evaluation for the smoky-hammy defect caused by smoke contamination. The procedure is applicable to quality control evaluation of cocoa beans and chocolate liquor received from producing countries. IFT

## 24

[Changes in the contents of vitamin A and vitamin E in pigs' liver and liver products during freezing and storage.]

Berndorfer-Kraszner, E.; Szentgyorgyi, M.; Szanto-Nemeth, E.



**Hütöipar** 24 (4) 115-122 (1977) [28 ref. Hu, en, ru]  
[Budapest Műszaki Egyetem, Biokémiai &  
Élelmiszertech. Tanszék, Műegyetem Rakpart 3,  
1521 Budapest XI, Hungary]

Methods for detn. of vitamins A and E in liver and liver products are described. Studies were conducted on detn. of vitamins A and E in samples of raw pigs' liver, fried pigs' liver, plain liver pate, and liver pate samples with additions of 1 of the following: 2% cod liver oil, 2% lecithin, 10% tomato puree, 10% red pepper puree, or 20 mg% DL- $\alpha$ -tocopherol. Block diagrams are given showing vitamin A concn., vitamin E concn., peroxide values, acidity values and flavour scores immediately after freezing, after holding for 8 h at +20° C, and after storage for  $\leq$  6 months at -20° C. The results show that vitamin A content was highest in raw liver; it decreased slowly during frozen storage, but sharply as a result of holding at +20° C after freezing. Vitamin E concn. was greatest in the tocopherol-fortified pate, followed by the fresh liver, and followed the same pattern of decline as vitamin A. Peroxide value increased with increasing storage time, and was highest in pate with added lecithin or cod liver oil; acidity value generally increased with increasing storage time and as a result of holding at +20° C. Flavour scores also tended to decrease with increasing storage time; the lowest scores were, however, commonly recorded for the samples held at +20° C. Of the products studied, the pate with 2% cod liver oil had the lowest flavour score. AJDW

## 25

**Analysis of incomplete block designs with reference samples in every block.**

Gacula, M. C., Jr.

**Journal of Food Science** 43 (5) 1461-1466 (1978) [21 ref. En] [Armour Res. Cent., Scottsdale, Arizona 85260, USA]

Sensory scores are relative and their magnitudes are highly dependent on the test samples being compared. In order to anchor the scores, the test samples are evaluated with reference to a control or standard. In this paper, balanced incomplete block and complete-incomplete block designs modified by the incorporation of a reference sample in every block are reviewed in view of their potential use in sensory evaluation. Examples of the design and statistical analysis are provided. IFT

## 26

**The taste test.**

Pierson, B.

**Nutrition and Food Science** No. 50, 4-7 (1977) [9 ref. En]

Sensory testing is discussed with reference to the different formats available (difference testing by paired comparison, triangle and duo-trio methods, or descriptive analysis by a trained panel). The selection and training of panel assessors are an important part of sensory analysis in its objective form; untrained observers may be used for subjective testing, in which a hedonic scale is often used, but the reasons for consumer preferences in these tests may not be clear. The organization of such tests is briefly considered, with reference to sampling, questionnaire design and location of survey centres. JRR

## 27

**Some comments of the estimation of sensory threshold by Kaerber and Scoville methods.**

Rhyu, H. Y.

**Journal of Food Science** 43 (5) 1632-1653 (1978) [5 ref. En] [Spice Products Co. Div., Farmer Bros. Co., 20333 S. Normandie Ave., Torrance, California 90509, USA]

Though poor precision is inherent in many organoleptic methods, the widely reported discrepancies of the Scoville results encountered in both within- and between-laboratories are partly attributable to the '3 out of 5 rule', which is not consistent with the standard definition of sensory threshold. Greatly improved precision is shown in this paper by the application of the Kaerber mean and s.d. to the response data, generated by algebraic combinations and obtained experimentally. Further improvement can be made with the increased number of dilutions presented. Since, finally, the response magnitude seems better correlated to the logarithm of concn., it is suggested that the present dilution schedule of the Scoville method be revised to logarithmic scale. IFT

## 28

**Objective measurement of the flavor quality of beer.** [Review]

Lindsay, R. C.

**Brewers' Digest** 52 (12) 44, 46-50 (1977) [43 ref. En] [Dep. Food Sci., Univ. of Wisconsin, Madison, Wisconsin, USA]

The subject is reviewed under the headings: flavour chemistry of beer; analysis of beer volatiles; sensory analysis of beer flavours; objective analysis of beer quality; and objective measurements of beer flavour quality (specifically the PTPA (% total peak area) statistical method for analysing gas chromatographic data; and discriminant analysis of volatile profile data, of physico-chemical variables, of flavour profile descriptor data, and of sensory data). HBr

## 29

**Use of cluster analysis to evaluate sensory-objective relations of processed green beans.**

Godwin, D. R.; Bargmann, R. E.; Powers, J. J.

**Journal of Food Science** 43 (4) 1229-1234 (1978) [38 ref. En] [Dep. of Food Sci., Univ. of Georgia, Athens, Georgia 30602, USA]

Cluster analysis was applied to the acceptability scores of panelists to partition the panel into groups showing a preference for either canned or frozen green beans. Cluster analysis was then applied to 20 sensory and 28 objective attributes to ascertain if the correlations changed according to whether differences had been judged by panelists preferring the canned or frozen product. The order of inclusion of terms and the correlations were affected. Flavour was the most important determinant of acceptability and mouthfeel was next most important. The utilization of particular descriptors to detect differences and sensory-objective relations varied according to whether the panelist scored canned or frozen green beans higher in acceptability. IFT



## 30

**Interpretation of the sensory significance of chemical data in flavour research. III. Sensory analysis.**  
Williams, A. A.

*International Flavours and Food Additives* 9 (4) 171-175 (1978) [33 ref. En] [Long Ashton Res. Sta., Bristol, UK]

A description is given of sensory descriptive profile procedures for assessing the sensory properties of foods and the problems of relating such information to hedonic assessments and consumer acceptance. [See FSTA (1978) 10 12T475 for part II.] VJG

## 31

**Sweetening of coffee and tea with fructose-saccharin mixtures.**

Hyvönen, L.; Kurkela, R.; Koivistoinen, P.; Ratilainen, A.

*Journal of Food Science* 43 (5) 1577-1579, 1584 (1978) [12 ref. En] [Dep. of Food Chem. & Techn., Univ. of Helsinki, 00710 Helsinki 71, Finland]

For reducing the calories from coffee and tea without reducing the conventional sweetness, drinks sweetened with mixtures of fructose and saccharin were prepared. Mixtures of fructose and saccharin, the sweetness of which in coffee, lemon tea and iced lemon tea corresponded to that of 5% sucrose in the drinks, were prepared. Magnitude estimation and forced-choice paired comparison tests were used as methods. Using a triangle test with a trained panel it was checked whether the mixture-sweetened drinks were distinguishable from those sweetened with sucrose. In consumer tests a single sample test was used. Energy saving of 50-70% compared with equally sweet sucrose-sweetened coffee and tea could be achieved without deterioration of other taste qualities: IFT

## 32

**Sweetening of soft drinks with mixtures of sugars and saccharin.**

Hyvönen, L.; Koivistoinen, P.; Ratilainen, A.

*Journal of Food Science* 43 (5) 1580-1584 (1978) [14 ref. En] [Dep. of Food Chem. & Tech., Univ. of Helsinki, 00710 Helsinki 71, Finland]

Low-calorie base and cola-type soft drinks were prepared using 10% sucrose isosweet sugar-saccharin mixtures as sweeteners. The proportion of saccharin in the mixture, in which the aftertaste of saccharin was not noticed, was determined by an experienced taste panel. The equality of the sweetness of mixtures and 10% sucrose in the drinks was determined by the forced-choice paired comparison method. The noticeable differences between mixture-sweetened and sucrose-sweetened drinks were checked in the triangle test. The preferences for the drinks were tested by rank order and hedonic scaling test. The test drinks were also compared with corresponding commercial beverages. In consumer tests it was checked whether the mixture-sweetened drink was distinguishable from the sucrose-sweetened one in a normal condition of drinking, using single sample test. In consumer tests preferences were also tested by ranking. The following conclusions were drawn. To avoid aftertaste the proportion of saccharin in the sugar-saccharin mixture cannot be > 0.3% for

sweetening cola-type or > 0.4% for citrus-type soft drinks at the sweetness level of 10% sucrose. The test soft drinks sweetened with mixtures of sugar and saccharin were judged as good as or better than the corresponding conventional drinks on the market. Depending on the sugar component of the mixture the energy content of the drinks was 50-70% lower than that of the isosweet sucrose-sweetened one. [See also preceding abstr.] IFT

## 33

**[The quality of apples available on the fresh fruit market in Norway.]**

Kvale, A.

*Forskning og Forsøk i Landbruket* 28 (1) 43-61 (1977) [5 ref. No, en] [Forsoksgard, Ullensvang, Norway]

A study, conducted over the period Aug. 1974-Jan. 1976 on the quality of apples in 3 large towns, 5 small towns and 5 villages is described. 763 samples of Norwegian-grown and 377 samples of imported apples were studied. Quality aspects considered included soluble solids and acid contents, flavour, ripeness, colour, size, and skin damage. Effects of var., origin (Norwegian vs. imported), season, shop type and size of the village or town where the apples were purchased were studied, and correlations between quality characteristics are given. Numerous tables of data are included. Norwegian apples tended to have higher acid contents and slightly lower soluble solids contents and flavour scores than imported apples. Flavour scores were significantly correlated with soluble solids contents; for acceptable eating quality, soluble solids content should be  $\geq 10.6\%$ . The highest flavour scores were recorded during Oct.-Nov. for Norwegian and during April-June for imported apples. Ground colour was significantly positively correlated with flavour for Norwegian apples. Norwegian apples were smaller and had a higher incidence of skin damage than imported apples. AJDW

## 34

**[Different taste requirements of consumers.]**

Unterschiedliche geschmackliche Ansprüche der Verbraucher.

Löhden, A.

*Erwerbsobstbau* 19 (6) 101-104 (1977) [De] [Trabener Strasse 55, 1000 Berlin 33]

This 2nd part of the study of taste-panel testing of apples [see FSTA (1978) 10:1J91 for 1st part] is concerned with effect of particular preferences of panel members (Technische Freie Hochschule students in Berlin) on taste evaluation of apples. It is shown how preference for sweet, sour, or aromatic characteristics affects scoring and low groups of panel members classified on such basis may give markedly different rankings in variety comparisons. Effects of pronounced taste characteristics on general assessment and of time variations are also considered. [See following abstr.] SKK

## 35

**[Appraisal value of taste-panel testing of apples in the light of experience.]** Erfahrungen zum



Aussagewert von Geschmacksproben mit dem Apfel.  
Löhden, A.

*Erwerbsobstbau* 19 (7) 120-123 (1977) [37 ref. De]  
[Trabener Strasse 55, 1000 Berlin 33]

The extent to which taste-panel verdicts on apples reflect customer preferences and demands and the shaping of prices is considered and discussed in this 3rd part of the study of taste-panel testing of apples [see preceding abstr. for the 2nd part]. The bearing of external appearance on both customer and panel judgement is considered. The view is expressed that, in general, customers and panel members prefer mildly tasting apples with balanced sweetness, acidity and aroma characteristics; and that taste panels are capable of detecting quality deterioration connected with defective handling, harvesting and storage; and that marketing could benefit from tactful advice of taste-panels in apple-growing areas. SKK

### 36

Changes in the organoleptic quality of Shamouti oranges during their ripening season.

Basker, D.

*Journal of Food Quality* 1 (2) 147-156 (1977) [11 ref. En] [Div. of Food Tech., Agric. Res. Organization, PO Box 6, Bet Dagan, Israel]

Segments and juice of stored and unstored shamouti oranges were assessed by taste panels. No statistically significant difference was found between taste quality scores of segments and juice of unstored oranges, but juice of stored oranges was given a higher quality score than segments. Multiple regression analysis of taste quality scores was carried out on Brix, acidity and maturity ratios, and results were found to be statistically highly significant. A min./max. in the contours of curves of equal taste quality scores, according to the multiple regression equations, reflect peak organoleptic maturity. Peak maturity was found to occur earlier in stored fruit when consumed as segments than in unstored fruit; when consumed as juice, peak maturity was found to be independent of the storage parameter. SP

### 37

The effect of Imidan on the flavour of riced baked potatoes.

True, R. H.; Barden, E. S.

*American Potato Journal* 55 (8) 437-439 (1978) [3 ref. En, es] [Dep. of Food Sci., Univ. of Maine, Orono, Maine 004473, USA]

Samples of potatoes from untreated plots and from plots treated with 4 applications (at the rate of 2.24 kg 50-WP/ha) of the foliar insecticide Imidan were evaluated for flavour by a sensory panel of 16 judges. There was no significant difference between the TS content of the control and the treated samples. The treated potatoes were rated significantly ( $P = 0.05$ ) lower in flavour than the control, however the mean of the treated samples ( $-0.49$ ) was within the range of  $+0.20$  to  $-0.59$  and was interpreted as equal to the standard in flavour. The tested rate of Imidan application showed no association with off-flavours of riced baked potatoes. VJG

### 38

Effect of rigor state, phosphate addition and aging on quality of turkey rolls.

Kardouche, M. B.; Stadelman, W. J.

*Poultry Science* 57 (2) 425-432 (1978) [38 ref. En] [Dep. Anim. Sci., Purdue Univ., W. Lafayette, Indiana 47907, USA]

Light and dark turkey rolls were made with pre- and post-rigor meat that was mixed for variable lengths of time (10 and 30 min), with 2 levels of polyphosphate (Kena, O and 0.45%), stuffed into casings and frozen immediately. Rolls were thawed for 12 h at room temp. and steam cooked to an internal temp. of 76° C. Quality was evaluated by an 8 member semitrained panel and by obtaining shear values with a Kramer shear press attached to an Instron. Mixing for 30 min and phosphate addition improved cooked yields and sensory panel scores. Post-rigor meat had lower shear values than pre-rigor meat but mixing lowered the shear values such that pre-rigor meat that was mixed for 30 min had shear values not significantly different from post-rigor meat mixed for 30 min. The panel could not detect any differences between pre- and post-rigor samples. In the 2nd study, rolls were made from conventionally chilled meat, pre-rigor deboned meat chilled for 1, 2, or 3 days, or from pre-rigor meat with prepared rolls being aged for 1, 2, or 3 days in a cooler at 3.3° C. Rolls made from pre-rigor deboned meat and aged for 3 days had the highest cooked yields; rolls made from pre-rigor meat aged for 3 days had the lowest shear values. The degree of tenderness of rolls made from conventionally chilled carcasses was comparable to that of the 3 day ageing period. The sensory panel could not detect any differences due to treatments. AS

### 39

Sensory evaluation of betanine and concentrated beet juice.

Pasch, J. H.; Elbe, J. H. von

*Journal of Food Science* 43 (5) 1624-1625 (1978) [11 ref. En] [Dep. of Food Sci., Univ. of Wisconsin-Madison, Madison, Wisconsin 53706, USA]

Betalaine pigments extracted from red table beets (*Beta vulgaris* L.) have been employed as colour additives frequently since the Federal FDA prohibited the use of FD&C Red No. 2 and No. 4. The contribution of betanine and beet juice concentrate to the flavour of buffered solutions and gelatin dessert was assessed by sensory tests. Results of triangle tests indicated betanine to be flavourless, while conc. beet juice had a flavour which can be successfully masked when added to flavoured gelatin dessert powders. IFT

### 40

[Flavour and aroma characteristics of natural extracts of black pepper.]

Kostrzewa, E.; Karwowska, K.

*Prace Instytutów i Laboratoriów Badawczych Przemysłu Spożywczego* 27 (2) 93-102 (1977) [38 ref. Pl, ru, en] [Inst. Przemysłu Fermentacyjnego, Warsaw, Poland]

A Polish extract of black pepper was compared with foreign preparations. Contents of piperin and volatile



oils were determined and separation of components by gas chromatography was made. Liquid dichlorodifluoromethane was used as extractant. The evaluation criteria were piperin and volatile oils content, and flavour and aroma of the product assessed organoleptically, and related to the basic raw materials. The Polish extract received relatively high rating. Parallel gas chromatographic studies of Polish extract volatile oils and of raw material volatile oil showed a considerable similarity of quality and peaks distribution. STI

#### 41

[Food concentrates. Methods of determining organoleptic properties, digestibility and suspension stability.]

Union of Soviet Socialist Republics, Gosudarstvennyi Komitet Standartov

*Soviet Standard GOST 15113.3-77*, 3pp. (1977) [Ru]

This standard, which partially supersedes GOST 15113.2-69, deals with sampling, methods, equipment, materials and procedure for organoleptic testing of food concentrates, for determining digestibility (temp. for cooking individual foods and methods of establishing cooking time are given) and also for testing the suspension stability of beverages with added milk or cream. KME

#### 42

Sensory response to food. A sensory workshop.

[Book]

Genser, M. V.; Moskowitz, H.; Solms, J.; Roth, H. J. 152pp. (1977) [many ref. En] Zurich, Switzerland; Forster Verlag AG [Dep. of Food & Nutr., Univ. of Manitoba, Winnipeg, Manitoba R3T 2N2, Canada]

This book is No. 4 in the series Reviews in Food Science and Technology, and contains the information and instructions presented to the participants of the sensory workshop, the experimental data obtained and a discussion of the results. Chapters include: Introductory demonstration (pp. 11-26, 8 ref.); Demonstration with taste (pp. 27-58, 8 ref.); Demonstrations with odor (pp. 59-75, 4 ref.); Demonstrations on selecting and training panelists (pp. 76-100, 10 ref.); Demonstrations on sensory interactions (pp. 101-125, 9 ref.); Demonstrations of food preferences (pp. 126-133, 3 ref.); and Out from single items into the real world of menus (pp. 134-149, 3 ref.). SP

#### 43

[Coordination of industrial food research in the EEC and associated European countries in the framework of COST.] [Lecture]

Vos, G.

*Annales de la Nutrition et de l'Alimentation* 32 (2/3) 689-697 (1978) [Fr, en] [Div. des Ind. Alimentaires, CEE Rue de la Loi 200, B-1049 Brussels, Belgium]

The EEC Commission has undertaken, on request from industry, a study of the structure and resources used in industrial research on foods, and published in 1975 an analysis for each member state, as well as a directory of the agriculture and food research centres. A working group of experts from member states and

collaborators within the framework of COST (committee of members of the "nine" and 10 other W. European countries for promoting European scientific and technical cooperation) has prepared 2 programmes, aimed at developing and coordinating research in physical properties (Theme A: rheology, water activity and thermal properties of milk, whey, sweetened juices, pasta, cheese), and in organoleptic and nutritional properties (Theme B: effects of treatments and distribution in cereal and dairy products, fruits, and vegetables, meat and poultry, fish, baby foods, eggs, sugar). Other sectors are at present under investigation by the Commission (e.g. textured vegetable proteins). [From En summ.][See FSTA (1979) 11 5A346.] RM

#### 44

Quality of Florida canned grapefruit juice in supermarket stores of the United States. [Lecture] Ting, S. V.; McAllister, J. W.

*Proceedings of the Florida State Horticultural Society* 90, 170-172 (1977) [9 ref. En] [Florida Dep. of Citrus, PO Box 1088, Lake Alfred, Florida 33850, USA]

About 50% of the samples of canned grapefruit juice produced in Florida and collected regularly from the supermarket stores in various parts of the USA were found to be below a flavour score of 5 (neither like nor dislike) on a 9-point hedonic scale. Correlation studies of the various quality factors with flavour scores were made. Significant, although low, correlation coeff. were found between bitterness and limonin. Furfural was found to be related to the time period between packing and analysis. Similar relationships were found between this time period and the tinny flavour of the product. [See FSTA (1979) 11 5J629.] AS

#### 45

Prediction of sensory quality of orange beverage on the basis of gas chromatographic profiles.

Pokorny, J.; Velisek, J.; Televantou, M.; Hrdlickova, M.; Karnet, J.; Davidek, J.

*Nahrung* 22 (8) 661-667 (1978) [28 ref. En, de, ru] [Dep. of Food Chem. & Analysis, Prague Inst. of Chem. Tech., Prague, Czechoslovakia]

An orange beverage prepared from orange concentrate, sugar, citric acid, ascorbic acid, natural orange oil and water was stored at 4°C and at 25°C in glass bottles and polystyrene cups for 1-7 days. Changes of odour and flavour were correlated with changes of ascorbic and dehydroascorbic acids, and with changes of profiles obtained by gas chromatography of chloroform extracts. Chromatographic peaks suitable for the prediction of sensory quality were selected by multiple regression analysis of experimental data. Very close correlations were found for some peaks and their combinations. IN

#### 46

[Statistical analysis of collaborative trials carried out in (Swiss) breweries on the significance and control of the cold-break content of wort.] Statistisch fundierte Erkenntnisse aus grosstechnischen Ringversuchen über Bedeutung und Steuerung des



Würzekühltrubgehaltes. [Lecture]

Schur, F.; Pfenninger, H. B.

*Proceedings, European Brewery Convention 16th Congress*, 225-233 (1977) [De, en, fr] [Versuchsst. Schweizerischer Brauereien, Zürich, Switzerland]

At 18 Swiss breweries full-scale technical trials were carried out in which yeast was pitched repeatedly in untreated wort or in wort partly freed from 'cold-break'. It appeared that the 'cold-break' contents in the examined pitched worts varied over a wide range, independently from the separating procedure. Data on % removal of 'cold-break' provided, therefore, only very little information. In order to determine the influence of partial 'cold-break' separation on subsequent production and on the quality of the beer, a comparative trial was carried out with the results of the 2 series of trials according to the t-test. Moreover, correlations between the contents of 'cold-break' in the pitching worts and individual parameters of fermentation and of the most important criteria of quality in the resulting beers were examined by correlation and regression methods using a computer. Generally non-linear relationships were found. The effect of the 'cold-break' content on yeast, fermentation, maturation and clarification was not significant. In relation to beer quality, a trend was observed in which the analytical values of the products from the untreated brews tended to be more favourable. However, in other breweries sensory evaluation revealed that during the course of successive fermentations, the preference shifted from the beers prepared from the untreated worts to those whose production had undergone partial removal of 'cold-break'. Biometric evaluation of the extensive series of trials indicated, in addition, that the 'cold-break' content of the wort is influenced significantly both by raw materials and brewing conditions. From multiple regression analyses of the data from all brews, important information was obtained for practical brewing control of the level of 'cold-break'. It is not absolutely necessary therefore to carry out a special 'cold-break' removal during brewing. [See FSTA (1979) 11 5H707.] AS

## 47

Report of the Flavour Terminology Working Group. [Lecture]

Dalglish, C. E.

*Proceedings, European Brewery Convention 16th Congress*, 792-795 (1977) [En, de, fr] [Brewing Res. Foundation, Nutfield, Surrey, UK]

The activities of the Flavour Terminology Working Group have concentrated on terminology, reference substances to illustrate terminology, and flavour thresholds. [See FSTA (1979) 11 5H707.] SP

## 48

[Application of factor analysis on analytical data of commercial sake.]

Ito, K.; Nakano, S.; Takahashi, T.; Tsuji, K.; Ito, Y.; Takenaka, S.; Nishikawa, H.

*Journal of the Society of Brewing, Japan [Nihon Jozo Kyokai Zasshi]* 73 (8) 631-635 (1978) [13 ref. Ja] [Tech. Cent., Nagoya Tax Administration Bureau, Nagoya, Japan]

Factor analysis was made on 24 analytical data and 5 items of sensory evaluation. Factors on colouring, UV absorption, electrical conductance and metal contents, amino acids and rice digestion, extracts, and acidity were extracted. Their correlations to the overall sensory evaluation, heaviness, sweetness, cleanliness, and maturation of sake are discussed. YN

## 49

Relations among sensory and objective attributes of canned Rabbiteye (*Vaccinium ashei* Reade) blueberries. I. Analytical data and overall acceptability.

Powers, J. J.; Smit, C. J. B.; Godwin, D. R.

*Lebensmittel-Wissenschaft und -Technologie* 11 (5) 252-256 (1978) [16 ref. En] [Dep. of Food Sci., Univ. of Georgia, Athens, Georgia 30602, USA]

4 cv. Tifblue, Woodard, Briteblue, and Southland, of the Rabbiteye blueberry (*Vaccinium ashei* Reade) were canned, and then the blueberries were evaluated 1 yr later for overall acceptability, flavour, mouthfeel, colour and appearance. The panel members were also asked to evaluate the products for seediness, clumping of the berries, and several other attributes in an effort to ascertain specific flaws and desirable characteristics. A commercially canned blueberry sample from Michigan was used as a reference. The wt. of gelatinous material suspended in the covering syrup, viscosity, % soluble solids, and force required to compress the berries without breaking the skin did not differ significantly among any of the cv. and the reference product. The % drained wt., pH, total acidity, seed wt., force required to puncture the skin, and spectral absorbancy and reflectance did differ among the 5 lots tested. The pH of the commercial blueberries was significantly higher than those of the 4 Rabbiteye cv. To distinguish among the cv., several of the objective tests had to be employed in unison. In overall acceptability, flavour, and mouthfeel, the commercial product was scored highest, but in appearance and colour, it was intermediate in acceptability. AS

## 50

Relations among sensory and objective attributes of canned Rabbiteye (*Vaccinium ashei* Reade) blueberries. II. Cluster and discriminant analysis examination.

Powers, J. J.; Smit, C. J. B.; Godwin, D. R.

*Lebensmittel-Wissenschaft und -Technologie* 11 (5) 275-278 (1978) [15 ref. En] [Dep. of Food Sci., Univ. of Georgia, Athens, Georgia 30602, USA]

The means for 19 objective tests applied to canned Rabbiteye blueberries were calculated by simple averaging. Means for 5 acceptability factors and specific descriptive terms were weighted by multiplying the scores of each panelist by his/her inverse variance in scoring. The weighted sensory means and the average values for the objective measurements were then merged into a 54 × 54 matrix (5 acceptability factors, 30 specific descriptors, 19 objective measurements) with 16 values (4 products × 4 replications) in each cell. Cluster analysis permitted relations among the sensory and objective measurements to be established. Integration of the 2 types of measurements, followed by



stepwise discriminant analysis, was useful in resolving differences among 4 canned Rabbiteye cv. and between the canned Rabbiteye vs. and a commercially-canned blueberry. [See preceding abstr. for part I.] AS

## 51

[Selection of the correct strawberry variety for freezing.] Die richtige Erdbeersorte zum Einfrieren wählen.

Genenger, M.

*Verbraucherdienst*, B 23 (5) 112-113 (1978) [6 ref. De]

Studies on consumer evaluation of the organoleptic properties of frozen strawberries of the var. Senga Sengana, Gorella, Zephyr, Red Gauntlet, Senga Litesa, Senga Tigaiga and Hummi Ferma are described; a table is given of data for the flavour scores and overall quality scores (on a 9-point scale) of samples of these var. studied in 1972, 1974 and 1975. Overall, Senga Sengana was rated highest; Hummi Ferma, Senga Tigaiga and Zephyr were also rated highly in some trials. AJDW

## 52

[Studies on sensory characterization of apple varieties. I. Early ripening varieties.] Beiträge zur sensorischen Charakterisierung von Apfelsorten. I. Frühsorten.

Tunger, L.; Groh, W.; Rothe, M.

*Nahrung* 22 (8) 669-681 (1978) [5 ref. De, en, ru] [Zentralinst. für Ernährung, Potsdam-Rehbrücke, German Democratic Republic]

A scheme for sensory testing of apple quality is described, based on evaluation of sweet and sour tastes, aroma intensity, harmony of flavour and taste, juiciness, aftertaste and crispness of the fruit flesh, and the greasiness, firmness and peelability of the skin. Studies on the 4 early apple var. Klarapfel, James Grieve, Stark Earliest and Helios are described; tables of results are given. The results show James Grieve and Helios to be of superior quality to the other 2 var. IN

## 53

For processing - savoy or smooth leaf spinach?

Kays, S. J.; Williams, J. W.

*Arkansas Farm Research* 26 (5) 15 (1977) [En] [Agric. Exp. Sta., Div. of Agric., Univ. of Arkansas, Fayetteville, Arkansas 72701, USA]

Commercially and experimentally produced canned spinach of the smooth-leaf or the savoy types was evaluated by taste panel and by colour difference meter and shear press. Leaf integrity and shear values were lower in savoy types than in smooth-leaf cv. in both commercially and experimentally canned spinach. Holding the vegetables at 82° C for ≤ 6 h did not significantly affect colour, general appearance, integrity or shear value of either type, although this treatment did not accurately reflect conditions in an institutional serving line. JRR

## 54

[Method of conducting organoleptic evaluation.]

Mar'inskii, A. M.; Mar'inskaya, L. K.; Kozhevnikova, N. N.

*Trudy, Vsesoyuznyi Nauchno-issledovatel'skii Institut Maslodel'noi i Syrodel'noi Promyshlennosti* No. 19, 55-60, 78 (1975) [Ru] [VNIIMiSP, Uglich, USSR]

Detailed guidelines are presented on organoleptic assessment of foods. They cover qualifications of experts; and requirements on premises, equipment and apparatus, sample preparation, time and procedure of tests, and panel composition. SKK

## 55

[Results of ice cream testing of the German

Agricultural Society (DLG) in 1978.] Ergebnisse der DLG-Speiseprüfung 1978.

Gussek, K. W.

*Deutsche Milchwirtschaft* 29 (40) 1458-1459 (1978) [De]

Organoleptic, chemical, physical and bacteriological tests were carried out on 77 ice cream samples supplied by 13 industrial manufacturers in the Federal Republic of Germany. The samples were stored for 14 days at -20° C and then tempered to -15° C 24 h before testing. In tests for flavour, 62.3% of all the samples were given the max. number of points possible (5), 32.5% were given 4 points and 5.2% were given 3 points; corresponding figures for appearance were 92.2, 7.8 and 0%, and those for texture were 88.3, 11.7 and 0%. In the overall assessment, 41 samples qualified for the highest award, 23 for the silver medal and 4 for the bronze medal. 4 samples exhibited slight deviations in flavour which were described as old, flat and atypical. FL

## 56

[Hydrolysis of lactose in the permeate from milk or whey by enzyme membrane reactor.] [Lecture]

Roger, L.; Maubois, J. L.; Thapon, J. L.; Brule, G.

*Annales de la Nutrition et de l'Alimentation* 32 (2/3) 657-669 (1978) [many ref. Fr, en] [INRA, 65 Rue de Saint Brieuc, 35042 Rennes Cedex, France]

Low-lactose milk and milk products were obtained by continuous lactose hydrolysis of the permeate in a membrane enzymic reactor by a commercial β-galactosidase. Under optimal conditions, i.e. pH 6.6, 33° C, Ca elimination 15%, enzyme concn. 0.8 g/kg, 80% lactose hydrolysis was obtained at an output of 10 l/h/m<sup>2</sup> of membrane (XM 50). 3 methods were proposed for demineralization, to avoid calcium phosphate deposit on and in the reactor membranes: complexing Ca by addition of sodium citrate, eliminating insoluble Ca salts before entry of the permeate into the reactor by 30 min heating at 70° C, or by electrodialysis or ion exchange. The low-lactose milk was evaluated by a tasting panel: 60% of panelists rather liked the sweet taste of the hydrolysed milk. The product can be used for direct consumption, or for production of concn. milk, ice cream, yoghurt, and a 'milk sugar' sweetener prepared by concentrating lactose-hydrolysed and completely demineralized permeate. Nutritional aspects are discussed in terms of galactose metabolism. [See FSTA (1979) 11 5A346.] RM



## 57

**Taste panel assessment and proximate composition of cultured and wild sea scallops, *Placopecten magellanicus* (Gmelin).**

Naidu, K. S.; Botta, J. R.

*Aquaculture* 15 (3) 243-247 (1978) [11 ref. En] [Dep. of Fisheries & Environment, Newfoundland Biol. Sta., 3 Water Street, St John's, Newfoundland A1C 1A1, Canada]

Cage-cultured and wild sea scallops, *Placopecten magellanicus*, sampled from a location in Placentia Bay, Newfoundland, were assessed by taste panels. Of the 5 sensory variables investigated (appearance, odour, texture, flavour and overall acceptability), only appearance ( $P \leq 0.01$ ) and overall acceptability ( $P \leq 0.05$ ) showed significant differences between the 2 groups. However, no preference was indicated. The adductor muscles were analysed for total carbohydrate, crude fat, crude protein, moisture and ash. The range for each component was similar ( $P > 0.05$ ) in both the cultured and wild populations. AS

## 58

**The effects on broiler chicken of polyphosphate injection during commercial processing. II. Sensory assessment by consumers and an experienced panel.**

Griffiths, N. M.; Wilkinson, C. C. L.

*Journal of Food Technology* 13 (6) 541-549 (1978) [9 ref. En] [Food Res. Inst., Colney Lane, Norwich NR4 7UA, UK]

Broiler chicken carcasses were injected with 4.5% by (eviscerated) wt. of a 5% polyphosphate solution prior to immersion chilling and freezing. Chickens were cooked and evaluated by consumers in their own homes or were cooked under standard conditions and evaluated by a laboratory sensory assessment panel or a consumer preference panel. Injected chickens were rated as significantly more tender and more juicy than non-injected chickens (significant at 0.1% probability level). In the home assessment, 32-45% of consumers (1090 individuals) did not distinguish between injected and non-injected groups, but of those that did distinguish, >50% rated the polyphosphate group as more tender and more juicy. 54% of households preferred the polyphosphate-injected chickens, 36% the non-injected, and 10% had no preference. In side-by-side consumer preference trials (265 assessors) the corresponding values were 41% for injected, 47% for non-injected, and 12% no preference. [See preceding abstr. for part I.] DIH

## 59

**A consumer test of bull vs. steer beef.**

Baron, P.; Lesser, D.; Robertson, I.; Parry, D.; Lowman, B.; Scott, N.; Prescott, J.

*Journal of the Science of Food and Agriculture* 29 (10) 885-894 (1978) [9 ref. En] [Dep. of Agric. Marketing, Univ. of Newcastle upon Tyne, Newcastle upon Tyne, UK]

Previous studies of the acceptability of bull beef have relied on laboratory panel or mechanical tests. This study extends the assessment to a consumer panel who cooked and ate the conventionally prepared steaks in their own homes. The test showed that consumers

distinguished bull steaks as leaner than steer steaks but did not discriminate on overall appearance. When it came to eating, however, bull steaks were judged to take longer to brown and be less satisfactory in terms of flavour, juiciness, tenderness and overall eating quality. On tenderness 11% of the sample marked the bull steaks as 'well below average'. These results are sufficiently clear to suggest the need for a test of their commercial impact. AS

## 60

**Fumigation of poultry food with methyl bromide: effects on flavour and acceptability of broiler meat.**

Griffiths, N. M.; Hobson-Frohock, A.; Land, D. G.;

Levett, J. M.; Cooper, D. M.; Rowell, J. G.

*British Poultry Science* 19 (4) 529-535 (1978) [19 ref. En] [Food Res. Inst., Colney Lane, Norwich NR4 7UA, UK]

Broilers were fed on control and treated commercial diets to test the effects of fumigation with methyl bromide gas at 69% and 25% over the value recommended for the elimination of salmonellae. In the first experiment roasted broilers were assessed for flavour as 'fresh' birds (max. storage 60 h at 1° C) and for flavour and odour after storage for 1-4 wk at -20° C with subsequent thawing overnight at 20° C. In the second experiment birds were assessed for odour only. The assessors used the scale: 0 (control), no difference; to 4, large difference. The mean flavour and odour difference ratings for coded controls and treated samples show that birds fed on methyl bromide-treated food were significantly different from the controls. Only 2 out of the 40 treated birds which were assessed were given mean ratings <1.0 and none of the control birds was given a mean rating >1. Similar odour differences for the stored birds were given for both treatment levels and there was no significant difference between breast and leg meat or between males and females. More than half the consumers in a home panel rated the control birds better than the birds fed on fumigated food. VJG

## 61

**Storage time-temperature effects on the odour preferences for uncooked chicken parts.**

Frijters, J. E. R.; Beumer-Stoffer, S. C. C.

*British Poultry Science* 19 (6) 737-740 (1978) [5 ref. En] [Spelderholt Inst. for Poultry Res., Min. of Agric. & Fisheries 7361 DA Beekbergen, Netherlands]

Whole broilers and separated legs were stored at -12° ± 1° C, -18° ± 1° C and -75 ± 2° C (reference group, whole carcasses only), for up to 9 months. Legs cut from the whole birds after removal from store, unpacking and thawing, and legs from the portions were compared in odour preference at four times of examination. After only 1 day the odour of the legs stored as parts at -12° C was less preferred than that of the reference group; this was also true for legs cut from whole birds after 3 months at the same temp. After 3 months at -12° C the odour of the legs stored as parts was less preferred than the odour of legs obtained from whole birds. Storage of legs as parts at -18° C resulted in a comparatively less preferred odour after 3 months, while the same was true after 9 months for legs cut from the carcasses. AS



## 62

[Interaction between flavouring substances and food components I. Behaviour of citral in mixtures of food components and water.] Wechselwirkungen zwischen Aromastoffen und Lebensmitteln. I. Das Verhalten von Citral in Mischungen von Lebensmittelkomponenten und Wasser.

Friedrich, H.; Gubler, B. A.

*Lebensmittel-Wissenschaft und -Technologie* 11 (4) 215-218 (1978) [5 ref. De, en] [Givaudan SA, 8600 Dübendorf bei Zürich, Switzerland]

An analytical method was found for determining citral content that could be reliably correlated with the findings of a trained sensory panel. This comprised extraction using organic solvent and centrifugation and analysing the dried organic layer by UV spectroscopy. The concn. exerted relatively little or no effect on accuracy of determination. This method and sensory detn. were used in investigations in which citral was added to aqueous solutions, suspensions or emulsions of various food components (sucrose, maltodextrin, saturated and unsaturated oils, casein, soy isolate, lactose, butterfat) or to water alone, and these were tested for citral following heat treatment (80-180° C) or after periods of storage at 4° or 45° C. The effects of pH and of nitrogen addition were also tested. Up to 75 and 33% of the citral content was registered at 80° and 120° resp., in oils but none at 180°, and up to 51 and 22% in carbohydrates and proteins, resp., at 80° C but up to only 18 and 14% at 120° C. During storage at 4° C citral disappeared most rapidly in casein and rapidly also in water, but rather more slowly in saccharides and butterfat (to about 10-20% after 70-80 days); in soy isolate, citral at first disappeared quickly, but later more slowly. Stability during storage appeared to be increased by addition of nitrogen and reduced by low pH. MJD

## 63

Optimizing sensory evaluation in product development. [Conference proceedings]

Prell, P. A. (United States of America, Institute of Food Technologists) (Chairman)

*Food Technology* 32 (11) 56-66 (1978) [En] [US Army Natick R&D Command, Natick, Massachusetts, USA]

Papers are published that were presented at a symposium held during the 38th Annual Meeting of the Institute of Food Technologists at Dallas, Texas, USA, 4-7 June, 1978. The papers include: The role of the sensory analyst in product development, by J. P. Erhardt (pp. 57-58; 66); Interface of marketing and sensory evaluation in product development, by J. R. Blair (pp. 61-62); and Bridging the gap between laboratory and consumer tests, by J. Elrod (p. 63). A further 2 papers are abstracted separately and are in the FSTA author index under United States of America, Institute of Food Technologists [Sensory Evaluation Symposium]. DIH

## 64

Short-cut signal detection measures for sensory analysis.

O'Mahony, M. A. P. D.

*Journal of Food Science* 44 (1) 302-303 (1979) [7 ref. En] [Dep. of Food Sci. & Tech., Univ. of California,

Davis, California 95616, USA]

Traditional sensory difference tests demonstrate whether a difference exists or not between 2 flavours; to determine the degree of difference requires further scaling. The 2 processes can be combined for perceptually small differences using difference tests based on signal detection measures. Such measures provide a measure of degree of difference directly which being a probability value is susceptible to analysis by parametric statistics. Traditional signal detection measures are complex and time consuming but the present paper outlines a short and simple means of calculating such measures. IFT

## 65

Consumer perceptions, attitudes, and trade-offs regarding flavor and other product characteristics. Moskowitz, H. R.; Chandler, J. W.

*Food Technology* 32 (11) 34-37 (1978) [6 ref. En] [MPi Sensory Testing Inc., 770 Lexington Avenue, New York 10021, USA]

Attempts were made to assess the precise role that flavour plays in the acceptance/rejection of foods, either in terms of actual taste/flavour perceptions or in terms of the image and importance that flavour projects in the consumer's mind. Grape-flavoured still beverages, varying in sucrose and flavorant contents, were used to measure flavour perception. Results indicated that sensory characteristics are altered by changing the levels of sucrose and flavorant and that a small change in these levels can dramatically alter product acceptability. For evaluating the relative importance of acceptable flavour vs. other product characteristics, 6 products (yoghurt, hamburger, coffee, cola drink, breakfast cereal, cheese pizza) were studied for flavour and 6 other attributes (e.g. price, appearance, ease of preparation); results indicated that the importance of flavour varies from product to product but that, generally, flavour is of paramount importance, particularly for beverages. In another study, panelists read short descriptions of fruit-flavoured yoghurts (varying in flavour acceptability, nutritional quality and price, and containing natural and/or artificial flavours) and then rated their interest in purchasing each variant. Statistical analysis of results indicated that, for acceptance, natural flavour is the most influential characteristic, followed closely by excellent nutritional quality, and that, for rejection, poor nutritional quality is the most damaging characteristic. JA

## 66

[Aroma and flavour substances in foods.] Aroma- und Geschmacksstoffe in Lebensmitteln.

Franzke, C.

*Lebensmittel-Industrie* 25 (6) 244-248 (1978) [17 ref. De, en, fr, ru] [Sektion Chem., Bereich Lebensmittelchem., Humboldt-Univ., Berlin]

After definition of some basic terms of importance in studies on sensory properties of foods, the current situation in relation to the classification, origin, formation and significance of aroma and flavour compounds in foods is discussed on the basis of literature data. IN



## 67

**Case studies demonstrating the role of sensory evaluation in product development.** [Lecture]  
Civille, G. V.

*Food Technology* 32 (11) 59-60 (1978) [1 ref. En]  
[44 Brentwood Drive, East Hanover, New Jersey 07936, USA]

3 case studies are presented which demonstrate how failure to fully consider sensory implications can lead to erroneous conclusions and how sensory evaluation can be as important in product development decisions as other factors, e.g. economics, availability of raw materials. In Case 1, involving whipped toppings, attempts were made to determine the consumer's concept of a textural ideal. It was thought that whipped cream would possess this 'ideal' but consumer texture profiles for the 'ideal' and whipped cream were not the same. Therefore, use of the sensory properties of whipped cream as a target for whipped toppings would not produce an ideal product. Case 2 illustrates the dangers of failing to ensure strict control of testing procedures; studies of an apparent difference in the sensory properties of peanut butters from 2 plants indicated that the butters were being compared to 2 different pilot-plant controls. Case 3 discusses the selection of a sensory evaluation programme for cookies in which 10% of the sucrose was replaced by another sweetener and illustrates the necessity of identifying the sensory problem, of selecting the proper methodology, and of considering the cost/benefit ratio of the various methodologies available. [See FSTA (1979) 11 6A411.] JA

## 68

**How the government views sensory evaluation.**  
[Lecture]  
Konigsbacher, K. S.

*Food Technology* 32 (11) 64-66 (1978) [En] [Herbert V. Schuster Inc., 14 Hayward Street, Quincy, Massachusetts 02171, USA]

US government agencies (e.g. FDA, Federal Trade Commission) accept the results of sensory panel studies as scientific evidence, even though such studies are not designed to yield absolute values. This view is discussed, reference being made to several examples which illustrate the government's attitude toward sensory panels and toward data obtained by sensory techniques, e.g. the acceptance by the FDA of the results of sensory evaluation as prima facie evidence of product efficacy. Consideration is also given to the acceptance of sensory data as evidence in legal cases. [See FSTA (1979) 11 6A411.] JA

## 69

**Sensory responses from groups of judges of varying sensory training under two testing conditions.**  
Phan Quang Vinh; Gonzales, R. R.

*Philippine Agriculturist* 61 (3/4) 141-149 (1977) [3 ref. En] [Dep. of Anim. Sci., Coll. of Agric., Univ. of the Philippines at Los Banos, Coll., Laguna, Philippines]

3 groups of judges (trained, semi-trained and untrained) evaluated frankfurter samples for flavour, tenderness, juiciness and general acceptability using a 7 point hedonic scale under 2 different conditions, i.e.

information was given or not given on the possibility that the treatments may or may not be the same. Results of statistical analysis indicated that training was the main factor with significant ( $P < 0.01$ ) effect on sensory ratings. The ratings of the trained group were not affected by test conditions, suggesting that a trained panel would provide more reliable and meaningful results. Weaknesses and strengths of the different groups of judges relevant to obtaining better sensory results are discussed. RM

## 70

**Flavour terminology of beer. A study of terms used to describe ale flavours.**

Brown, D. G. W.; Clapperton, J. F.

*Journal of the Institute of Brewing* 84 (6) 324-326 (1978) [6 ref. En] [Allied Breweries (Production) Ltd., Burton-on-Trent, Staffs., UK]

Experimental data on terms used to describe the odour, flavour and after-flavour impressions of 92 commercial ale samples were analysed by computer using a program for multi-dimensional scaling. 2-dimensional plots and solid models derived from the results of the analyses depict the relationships existing between the use of the descriptive terms. AS

## 71

**[Sensory and analytical evaluation of apple juice volatiles.]** Über die sensorische und analytische Bewertung von flüchtigen Stoffen in Apfelsäften.

Jepsen, O. M.

*Flüssiges Obst* 45 (11) 420-424 (1978) [28 ref. De, fr, en] [Food Tech. Lab., Tech. Univ. of Denmark, Copenhagen, Denmark]

15 commercial samples of apple juice were used for sensory evaluation by a trained panel and for qualitative and quantitative aroma analysis by the 'Tenax GC' adsorption and GLC method. Tabulated results showed that sensory aroma quality was negatively correlated with the absolute quantity as well as the % of ethyl acetate, and positively correlated with the % of ethyl-2-methyl butyrate, n-butanol and trans-2-hexenal. The aroma intensity was positively correlated with the absolute sum of n-butanol, trans-2-hexenal and n-hexanol, and the % of n-hexanol. RM

## 72

**Sensory evaluation of geosmin in juice made from cooked beets.**

Tyler, L. D.; Acree, T. E.; Smith, N. L.

*Journal of Food Science* 44 (1) 79-81 (1979) [16 ref. En] [Dep. of Food Sci. & Tech., New York State Agric. Exp. Sta., Geneva, New York 14456, USA]

A selected panel was used to determine the odour threshold of geosmin [trans-1,10-dimethyl-trans-(9)-decalol], an important aroma constituent of table beets, in juice made from cooked and peeled beets. The estimated threshold of 5.8 parts geosmin in  $10^9$  parts beet juice was  $35 \times$  higher than the odour threshold of geosmin in water determined by the same panel. 4 samples of cooked beet juice containing different levels of geosmin were subsequently ranked according to their characteristic beet-like aroma. An increase in



geosmin content was perceived as an increase in beet-like aroma up to a 5.8 ng/g concn. of geosmin. Juice made from cooked and peeled beets showed a 56–60% reduction in geosmin content in comparison with juice prepared from raw beets (with geosmin concn. < 5.8 ng/g). Therefore, processing may reduce the characteristic aroma of beets. IFT

## 73

### Effect of maturity on the nutrient content and the canning quality of Emerald soybean.

Islam, M. N.; Lea, R. A.

*Journal of Food Science* 44 (1) 204–207, 212 (1979) [32 ref. En] [Dep. of Food Sci. & Human Nutr., Univ. of Delaware, Newark, Delaware 19711, USA]

Nutrient content and the canning quality of a newly developed green-seeded soybean, Emerald, were evaluated 86, 90, 95, 100 and 105 days after planting. Nutrient analyses involving moisture, protein, fat, fibre, minerals, ascorbic acid and carotenes indicated that Emerald soybeans were superior or equal to lima beans and green peas. Canned soybeans were evaluated by a sensory panel using a rank order method. On the basis of the data on sensory evaluation and nutrient content, soybeans of 95-day maturity were found to be most desirable. IFT

## 74

### On the differences in the quality and composition of shii-ta-ke according to different processing methods. [Lecture]

Tanaka, F.; Saito, S.; Esashi, T.

*Mushroom Science* 9 (1) 521–529 (1976) [3 ref. En, fr, de] [Dep. of Nutr., Tokyo Agric. Univ., Tokyo, Japan]

Samples of the same batch of shiitake mushrooms (*Lentinus edodes*) were tested for quality and composition when (i) fresh, (ii) air-dried, (iii) freeze-dried, with freezing at  $-30^{\circ}\text{C}$  and drying at  $\leq 40^{\circ}\text{C}$ , and (iv) frozen, at  $-20^{\circ}\text{C}$ . Gas chromatographic examination showed the composition of (ii) to be very different from (i); (iii) and (iv) were similar to (i). Texture, measured by texturometer, was similar in (i) and (iii), but (ii) was much harder. Vitamin B<sub>1</sub> contents, determined after the samples were heated, were 0.24, 1.10, 1.42, 0.02 and 0.12 mg% in (i), (ii), (iii) and (iv, non-blanching) and (iv, frozen after blanching), resp. Free amino acids composition (tabulated) was similar in (i) and (iii). Results of sensory tests showed that (i) and (iv) were superior in appearance, (iii) in colour, and (ii) and (iii) in aroma. [See FSTA (1979) 11 6J859.] AL

## 75

### Composition and taste evaluation of rice milled to different degrees.

Roberts, R. L.

*Journal of Food Science* 44 (1) 127–129 (1979) [15 ref. En] [USDA W. Regional Res. Cent., SEA, Berkeley, California 94710, USA]

Although brown rice is more nutritious than well milled white rice, the outer seed coat contributes a definitely different flavour and texture which is disliked by many consumers. Changes in milling time and pressure in a McGill No. 3 laboratory scale rice mill

gave varying degrees of bran removal (3–10%).

Reduction of only small percentages of the outer bran layers yielded cooked products with a typical white rice flavour and less of the strong bran flavour and tough texture of brown rice. Samples were cooked using a standardized procedure and submitted to a panel of tasters. The average panel ranks showed no significant preference for any of the samples. However, detailed analysis of the data indicated that about half preferred the lightly milled samples and half preferred the conventional 'well milled' white rice. The undermilled rice showed increased milling yields and protein, fibre, fat, vitamin and mineral levels over white rice. These factors indicate improved nutrition for consumers at a favourable price, and reduced energy consumption in the milling process. IFT

## 76

### [Organoleptic quality and stability of desserts.]

Sensorische Qualität und Haltbarkeit von Desserterzeugnissen.

Prokopek, D.

*Molkerei-Zeitung Welt der Milch* 32 (34) 1081–1083 (1978) [5 ref. De] [Bundesanstalt für Milchwirtschaft, Kiel, Federal Republic of Germany]

105 items obtained on the Kiel market between Sept. 1977 and Jan. 1978 were examined. They consisted of 9 non-fermented flavoured milk drinks, 3 kefir products with or without addition of other foods, 38 yoghurt products of different consistencies and with or without addition of other foods, 10 fresh cheese preparations, and 38 puddings, creams and foams based on milk and/or water, with or without other foods and/or condiments and with or without cream topping. The UHT milk drinks were stored at  $20^{\circ}\text{C}$ , the remaining products at  $10^{\circ}\text{C}$ ; this temp. was chosen deliberately, despite recommendation of cold storage or storage at  $7-8^{\circ}\text{C}$  on labels of 86 items, because of possible breaks in the cold chain between manufacturer and consumer. The items were examined organoleptically for aroma, taste, appearance and consistency on the last day of the date marking on the container, the 5-point scale of the German Agricultural Society (DLG) being used. The mean period from purchase to last day was 76 days for the UHT products (range, 28–141 days), and for all other products, it was 12–22 days (overall range, 6–40 days). In general, the organoleptic quality of 80% of the products was good or very good (3.75–5.0 points); 5.7% were spoilt by mould, half of these were yoghurts with other food additions. Defects of other product categories are enumerated, in particular insufficient or excessive addition of flavourings. SKK

## 77

### Correlation of off-odor scores of canned tuna with gas chromatographic data.

Khayat, A.

*Journal of Food Science* 44 (1) 37–42 (1979) [48 ref. En] [Van Camp Sea Food Co., Div. of Ralston Purina Co., Res. Cent., 4245 Sorrento Valley Boulevard, San Diego, California 92121, USA]

Profiles of canned tuna volatiles were obtained using high resolution gas chromatography. A high correlation



between volatile profile and sensory panel scores was obtained. 2 models based on 3 or 5 major peaks were developed for predicting quality scores. Using such models, correlation coeff. of 0.90 and 0.91 were obtained. The error associated with predicted sensory scores using such models was in the order of  $\pm 0.5$  unit. Such error has the same magnitude as the inherent error associated with taste panel itself. IFT

## 78

**Training and testing of judges for sensory analysis of meat quality.**

Cross, H. R.; Moen, R.; Stanfield, M. S.

*Food Technology* 32 (7) 48–52, 54 (1978) [16 ref. En] [Meat. Sci. Res. Lab., USDA, Beltsville, Maryland 20705, USA]

An attempt was made to consolidate the various techniques used in the meat industry for selecting and training personnel for meat quality evaluation, the aim being to establish a method for selecting, training and evaluating judges who could be employed in identifying certain textural qualities of meat (juiciness, tenderness, connective tissue). The 4 steps involved in developing such a 'descriptive attribute panel' (personal interview, screening using triangle tests, training, performance evaluation) are detailed. To assess the validity of the method, grilled beef steaks varying in maturity and marbling were evaluated by 4 panels, each panel containing 10 members, after 4 months' training. Analysis of variance data were obtained for the results provided by each panelist in one panel and by each of the 4 panels. The results obtained by the 4 panels were also subjected to other statistical analyses. The results are tabulated and discussed. Correlation coeff. between the results obtained by the 4 panels were high for tenderness and connective tissue but low for juiciness. JA

## 79

**A comparison of roasting vs. broiling on the sensory characteristics of beef longissimus steaks.**

Cross, H. R.; Stanfield, M. S.; Elder, R. S.; Smith, G. C. *Journal of Food Science* 44 (1) 310–311 (1979) [5 ref. En] [USDA Meat Sci. Res. Lab., FR-SEA, Beltsville, Maryland 20705, USA]

Beef longissimus steaks ( $n = 72$ ) ranging in marbling from 'traces' to 'slightly abundant' and in maturity from 'A' to 'E' were roasted (oven temp. =  $175^{\circ}\text{C}$  and internal temp. =  $70^{\circ}\text{C}$ ) or broiled (electric grill temp. = about  $275^{\circ}\text{C}$  and internal temp. =  $70^{\circ}\text{C}$ ). A trained 12-member descriptive panel rated the cooked meat for tenderness, juiciness, amount of detectable connective tissue, and flavour intensity. Degree of maturity and USDA marbling score significantly affected all palatability traits, whereas cooking method (roasting vs. broiling) significantly affected only juiciness ratings. Roasted steaks were rated higher in juiciness, had lower cooking losses, and required longer cooking times to achieve the desired temp. endpoint than broiled steaks. Roasted and broiled steaks did not differ in tenderness, flavour intensity, or amount of detectable connective tissue. IFT

## 80

**Elevated conditioning temperature effects on beef carcasses from four nutritional regimes.**

Smith, M. E.; Kastner, C. L.; Hunt, M. C.; Kropf, D. H.; Allen, D. M.

*Journal of Food Science* 44 (1) 158–163 (1979) [23 ref. En] [Dep. of Animal Sci. & Ind., Kansas Agric. Exp. Sta., Manhattan, Kansas 66506, USA]

Beef carcasses from cattle on 4 nutritional regimes were subjected to selected postmortem temp. treatments to determine if chilling or conditioning would eliminate cold shortening and improve product characteristics. One-half from each of 38 grass-, short-, long- and forage-fed cattle was chilled at  $3^{\circ}\text{C}$  until 48 h postmortem. The other half from each carcass was conditioned at  $13^{\circ}\text{C}$  until 8 h postmortem and then chilled at  $3^{\circ}\text{C}$  for 40 h. The taste panel indicated that longissimus steaks from grass-fed cattle were more tender due to conditioning at  $13^{\circ}\text{C}$  as opposed to chilling at  $3^{\circ}\text{C}$ . Shear force and sarcomere length comparisons, however, did not support the taste panel. Chilling at  $3^{\circ}\text{C}$  did not consistently cause detectable cold shortening. In addition,  $13^{\circ}\text{C}$  conditioning did not significantly accelerate the rate of postmortem tenderization when compared with the  $3^{\circ}\text{C}$  treatment. Even though not always statistically different from the other nutritional regimes, the steaks from grass-fed cattle were consistently rated lowest by the taste panel. Generally no statistical differences were observed between nutritional regimes for shear force and sarcomere length. IFT

## 81

**Stability of prepackaged beef. II. The effect of sanitation, packaging, storage and display time on colour, discoloration and desirability.**

Gonzales, R. R.; Naumann, H. D.; Yeh, L. C.

*Philippine Journal of Veterinary and Animal Sciences* 1 (2) 133–142 (1975) [15 ref. En] [UPLA, Coll., Laguna, Philippines]

Effects of the previously described treatments on the colour and acceptability of prepacked beef steaks were investigated by sensory panel evaluation (8 point colour scale, 9 point hedonic scale). Tabulated results showed that 4% acetic acid treatment reduced the colour scores and increased discoloration scores.  $\text{CO}_2 + \text{O}_2$  packaged steaks maintained the desirable bright red colour and were highly acceptable throughout 13 days of storage and/or display (especially 15%  $\text{CO}_2 + 85\% \text{O}_2$ ). The successful shelf-life of vacuum-packed steaks was 6 days (3 days storage, 3 days display). Increasing the length of display generally reduced acceptability. Discoloration scores were highly correlated with desirability ( $r = 0.89$ ) and microbial counts ( $r = 0.75$ ); microbial counts were highly correlated with desirability scores ( $r = 0.85$ ). [See preceding abstr. for part I.] RM

## 82

**Organoleptic evaluation of lamb cured as 'bacon' and 'ham'. [Lecture]**

Moore, V.

*Publications, Meat Industry Research Institute of*



**New Zealand MIRINZ 529, 9-22 (1976)** [4 ref. En]  
[Meat. Ind. Res. Inst. of New Zealand Inc., PO Box 617,  
Hamilton, New Zealand]

Both 'bacon' (served hot) and 'ham' (served cold) from lambs fed on (i) maize silage, (ii) barley or (iii) pasture, and uncured roast shoulders from each treatment, were presented to an 18-member taste panel in paired flavour difference tests. Among shoulders, diets (i) and (iii) only were detectably different, and no significant preferences were found. Lamb hams from each treatment were detectably different from pork hams, but diets did not affect flavour. There were no significant preferences between lamb hams and pork ham. When given ham sandwiches, only 2 of 6 tasters detected a difference, only between (iii) and pork ham; again there were no significant preferences. Ham steaks were judged to have significant variation in tenderness, juiciness and general acceptability, but not flavour acceptability. Diet (i) hams scored best, and diet (ii) worst for all traits, with (iii) and pork ham intermediate. Similarly for bacon, diet produced no significant differences in flavour, but (i) and (iii) were different to pork bacon, with no significant preferences. Lamb bacons served with eggs, on toast, scored  $\geq 6.2$  on a 9 point hedonic scale for all quality traits and diets (acceptable  $\geq 4.5$ ). There were no significant differences between diets. [See FSTA (1979) 11 6S979]. JRR

### 83

**[Milk and dairy products. Sensory testing. Rennet cheese.]** Milch und Milcherzeugnisse. Sensorische Qualitätsprüfung. Labkäse.

German Democratic Republic, Institut für  
Milchforschung der DDR

**German Democratic Republic Standard TGL 26208/07, 35pp. (1977)** [De]

The approved scheme for sensory evaluation of rennet cheeses is described. The external appearance, internal quality (texture, colour, presence and type of holes), aroma and flavour are each evaluated on a 5-point scale; relative weighting factors are 0.9, 0.7, 0.4 and 2.0 for these 4 variables, giving max. weighted point scores of 4.5, 3.5, 2.0 and 10.0, resp. Tables are given for numerous cheese types, showing the scores to be awarded to samples showing specified quality characteristics or defects. AJDW

### 84

**[Milk and dairy products. Sensory testing. Non-ripening cheese.]** Milch und Milcherzeugnisse. Sensorische Qualitätsprüfung. Nichtreifende Käse.

German Democratic Republic, Institut für  
Milchforschung der DDR

**German Democratic Republic Standard TGL 26208/08, 20pp. (1977)** [De]

The approved scheme for sensory evaluation of non-ripening cheeses is described. External appearance, internal appearance/structure, aroma and flavour are each evaluated on a 5-point scale; relative weighting factors are 0.9, 0.7, 0.4 and 2.0 for these 4 variables, giving max. weighted scores of 4.5, 3.5, 2.0 and 10.0 points, resp. Detailed tables are presented for various fresh cheese types, showing the scores to be awarded to samples showing specified quality characteristics or defects. AJDW

### 85

**[Milk and dairy products. Sensory testing. Branded butter. Table butter. Fresh farm butter.]** Milch und Milcherzeugnisse. Sensorische Qualitätsprüfung. Markenbutter. Tafelbutter. Frische Landbutter.

German Democratic Republic, Institut für  
Milchforschung der DDR

**German Democratic Republic Standard TGL 26208/06, 7pp. (1977)** [De]

This standard specifies the approved scheme for sensory evaluation of butter. Appearance, consistency, aroma and flavour are each evaluated on a 5-point scale; relative weighting factors for these characteristics are, resp., 0.5, 1.0, 0.5 and 2.0, giving max. weighted scores of 2.5, 5.0, 2.5 and 10.0, resp. A detailed table for lactic and sweet-cream branded butters, lactic, sweet-cream and salted table butters, and lactic or salted fresh farm butters is given, showing scores to be awarded for samples showing various quality characteristics and defects. AJDW

### 86

**Odor similarities in structurally related odorants.**

Polak, E.; Trotier, D.; Baliguet, E.

**Chemical Senses and Flavor 3 (4) 369-380 (1978)**

[19 ref. En] [Lab. de Neurobiol. Sensorielle, EPHE, CENFAR BP. No. 6 Fontenay-aux-Roses 92260, France]

Similarity assessments against one or several references were used to estimate "earthiness" in 7 pure cyclic alcohols. The "earthy" odour quality of 3 isomers (I, II, IV) of the mould metabolite "geosmin" (1,10-dimethyl-9-decalol  $C_{12}H_{22}O$ ) was found in 2 other alcohols possessing a partial geosmin structure: exo-2-ethylfenchol ( $C_{11}H_{22}O$ ) (V) and cis-cis 2,6-di-methyl-cyclohexanol ( $C_8H_{16}O$ ) (VI). All have in common an axial hydroxy group attached to a 5 or 6 carbon ring with  $\alpha$ -methyls on both sides. The trans-cis and trans-trans isomers of 2,6-dimethyl-cyclohexanol (VII, VIII) both with equatorial hydroxy groups, were ranked as different from the above group. Instead, their odour resembled more that of their aromatic precursor - 2,4-dimethyl phenol (IX) - than that of their axial isomer (VI). The 2 trans-ring geosmin isomers (I, II) and 2-ethylfenchol (V) were still judged earthy at 1000  $\times$  the lowest concn. tested. However, the cis-ring geosmin isomer (IV) and the axial cyclohexanol (VI) were perceived by most subjects to change in quality: earthy at lower concn. but increasingly different at higher ones. Discrimination between earthy odorants decreased with decreasing concn. Geosmins I, IV and 2 ethyl-fenchol (V) were particularly confused. However, discrimination did not appear to be affected by prior adaptation to geosmin IV. Subjects appeared to be able to focus on the earthy odour quality component in single odorants IV, V, VI in which several other quality components could be discerned as well. AS

### 87

**Learning mechanisms in food selection.** [Book]

Barker, L. M.; Best, M. R.; Domjan, M. (Editors)

xiv + 632pp. ISBN 0-918954-19-3 (1977) [many ref. En]  
Waco, Texas, USA; Baylor University Press. Price \$20.00



This book consists of edited versions of 17 papers formally presented at a symposium on Learning Mechanisms in Food Selection held at Baylor University on 3-5 March, 1976, and is divided into 5 sections. Part I contains one chapter: On the origin of food aversion paradigms, by J. Garcia & W. G. Hankins (pp. 3-19, 60 ref.). Part 2 on comparative perspectives includes the following chapter: Comparative and field aspects of learned food aversions, by C. R. Gustavson (pp. 23-43, 56 ref.). Part 3 - the development of food preference - contains the following chapters: The ontogeny of food preferences in chicks and other animals, by J. A. Hogan (pp. 71-97, 34 ref.); Establishment of food preferences by exposure to ingestive stimuli early in life, by P. J. Capretta (pp. 99-121, 36 ref.); Attenuation and enhancement of neophobia for edible substances, by M. Domjan (pp. 151-179, 70 ref.); Associative and non-associative factors in learned food preferences, by D. M. Zahorik (pp. 181-199, 28 ref.); and Learning to initiate and terminate meals: theoretical, clinical and developmental aspects by R. C. Hawkins, II (pp. 201-224, 79 ref.). Part 4 on food aversion learning includes the following chapters: Specificity of conditioning mechanisms in the modification of food preferences, by T. J. Testa & J. W. Ternes (pp. 229-253, 61 ref.); and An opponent-process theory of motivation: V. Affective dynamics of eating, by R. L. Solomon (pp. 255-269, 15 ref.). Part 4-A on long-delay learning contains the following chapters: Status of 'learned safety' or 'learned noncorrelation' as a mechanism in taste aversion learning, by J. W. Kalat (pp. 273-293, 53 ref.); The nature of 'learned safety' and its role in the delay of reinforcement gradient, by M. R. Best & L. M. Barker (pp. 295-317, 30 ref.); and The concurrent interference approach to delay learning, by S. Revusky (pp. 319-366, 48 ref.). [Continued in following abstr.] SP

## 88

**Learning mechanisms in food selection.** [Book] Barker, L. M.; Best, M. R.; Domjan, M. (Editors) xiv + 632pp. ISBN 0-918954-19-3 (1977) [many ref. En] Waco, Texas, USA; Baylor University Press. Price \$20.00

[Continued from preceding abstr.] Part 4-B on non-gustatory aspects of food aversion learning includes the following chapters: The contribution of environmental non-ingestive cues in conditioning with aversive internal consequences, by P. J. Best, M. R. Best & S. Henggeler (pp. 371-393, 49 ref.); Studies of learned aversions using non-gustatory stimuli, by M. Nachman, J. Rauschenberger & J. H. Ashe (pp. 395-453, 20 ref.); and Visually guided avoidance of poisonous foods in mammals by N. S. Braveman (pp. 455-473, 25 ref.). Part 4-C on pharmacological aspects of food aversion learning contains the following chapters: The multifaceted nature of taste-aversion-inducing agents: is there a single common factor?, by E. Gamzu (pp. 477-509, many ref.); What studies on preexposure to pharmacological agents tell us about the nature of aversion-inducing agent, by N. S. Braveman (pp. 511-530, 20 ref.); and 'Sickness' and the backward conditioning of taste aversions, by L. M. Barker, J. C. Smith & E. M. Suarez (pp. 533-553, 41 ref.). Part 5

contains the following chapter: The significance of learning mechanisms in food selection: some biology, psychology and sociology of science, by P. Rozin (pp. 557-589, many ref.). Part 6 contains the following chapter: Condition taste aversions: a bibliography, by A. L. Riley & C. M. Clarke (pp. 593-616). A name index (pp. 617-625) and a 6-pp. subject index are also given. SP

## 89

**The experimental study of food.** [Book] Campbell, A. M.; Penfield, M. P.; Griswold, R. M. Ed. 2, xiii + 513pp. ISBN 0-395-26666-1 (1979) [many ref. En] Boston, Massachusetts, USA; Houghton Mifflin Co. [Univ. of Tennessee, Knoxville, Tennessee 37916, USA]

This book, intended for use in a first course in experimental foods, presents the scientific basis for an understanding of the nature of food, and promotes the principles of experimental methodology as applied to food. Chapters in the introductory section include: Introduction to food experimentation (pp. 1-16, 15 ref.); and Introduction to food science (pp. 17-42, 9 ref.). Part I, entitled Food Science Today, contains the following chapters: Eggs (pp. 44-85, many ref.); Milk and milk products (pp. 86-107, 53 ref.); Meat, poultry, and fish (pp. 108-161, many ref.); Fruit and vegetables (pp. 162-206, many ref.); Food preservation (pp. 207-246, many ref.); Fats and their lipid constituents (pp. 247-281, 39 ref.); Starch and flour (pp. 282-313, 37 ref.); Leavening agents (pp. 314-331, 15 ref.); Yeast breads and quick breads (pp. 332-368, 43 ref.); Cakes and pastry (pp. 369-404, 43 ref.); and Sugars and crystallization (pp. 405-424, 11 ref.). Part II, entitled Food Experimentation, includes the following chapters: Approaching the experiment (pp. 426-432, 2 ref.); Evaluating food by sensory methods (pp. 433-450, 28 ref.); Evaluating foods by objective methods (pp. 451-484, 73 ref.); and Preparing the report (pp. 485-495, 5 ref.). An appendix of scales for sensory evaluation and a 15-pp. subject index are also included. SP

## 90

**[Assessment of appeal of beer.]**

Curin, J.  
*Kvasny Prumysl* 24 (8) 169-172 (1978) [3 ref. Cs, ru, en, de] [Pokusne a Vyojove Stredisko GRPS, Prague, Czechoslovakia]

Methodology is described for assessing the 'drinking appeal' of beer, based on classification of the taster's feelings after imbibing an accurately determined quantity of beer. STI

## 91

**A comparison of various maturity indices for table grapes.** (In 'Table grapes and refrigeration' [see FSTA (1979) 11 7J1065]) [Lecture] Combrink, J. C.; Ginsburg, L.; Truter, A. B.; Westhuizen, A. J. M. van der pp. 27-32 (1977) [7 ref. En, fr] [Fruit & Fruit Tech. Res. Inst., Stellenbosch, South Africa]

8 South African table grape cv. were used to find the most reliable and practical method for determining



stage of maturity. The berries were sorted into groups of different sugar content by immersion in a series of graded sugar solutions at the expected sp. gr. range. Palatability preferences were determined by a taste panel. Physical and chemical properties of each group were determined and correlated with palatability. Colour, pH and acid values showed a good correlation with palatability. Colour, however, cannot be objectively measured, while the range of both pH values and acid concn. was too small to make these methods reliable maturity indices. The sugar:acid ratio, currently used in South Africa, varied greatly from yr to yr. Changes in acid concn. were inconsistent and detn. of the acid content was time consuming, which invalidated this method. The % total soluble solids was the most reliable factor. There was a highly positive correlation between sugar content and palatability which was consistent from yr to yr for all cv. Sugar content is easily and rapidly determined with a hand refractometer, which makes this method suitable for farm and laboratory use. AS

## 92

[Evaluation of Antarctic and South Atlantic fish.]

Prüfung antarktischer und südatlantischer Fische.  
Körner, W.

*Informationen für die Fischwirtschaft* 26 (1) 39-41 (1979) [1 ref. De] [Inst. für Biochem. & Tech., Hamburg, Federal Republic of Germany]

Taste-panel studies on fried and steamed samples of Antarctic and S. Atlantic fish (*Genypterus capensis*, *Macrouron magellanicus*, *Merluccius hubbsi*, *Champoscephalus gunnari*, *Notothenia gibberifrons*, *N. rossi marmorata* and *Dissostichus eleginoides*), are described. A table of results is given for overall sensory score, fat content and acid value. The results show that sensory scores were generally higher for fried than steamed samples, possibly as a result of masking of undesirable flavours by the breading mix. Of the spp. studied, only *D. eleginoides* was rated 'good to very good'. *N. gibberifrons* was rated 'satisfactory to good', the other spp. being rated 'adequate to moderate'. The poor ratings were generally associated with criticisms of rancid off-flavours; acid values of these samples were relatively high. It is suggested that the restricted storage life of these fish should be taken into consideration in plans for marketing. *N. gibberifrons* was awarded high sensory scores in spite of having a high acid value. AJDW

## 93

Vacuum aging, display and level of nutrition effects on beef quality.

Gutowski, G. H.; Hunt, M. C.; Kastner, C. L.; Kropf, D. H.; Allen, D. M.

*Journal of Food Science* 44 (1) 140-145, 150 (1979) [32 ref. En] [Dep. of Animal Sci. & Ind., Kansas State Univ., Manhattan, Kansas 66506, USA]

Vacuum ageing and display effects on various quality traits of beef produced from 38 cattle on 4 nutritional regimes (grass-, short-, long-, and forage-fed) were studied. Anterior halves of longissimus, biceps femoris, semitendinosus, and semimembranosus muscles were fabricated into steaks at 48 h postmortem; posterior

halves were vacuum aged for 21 days at 0-1°C before fabrication. Taste panel, shear force and cooking analyses were done on steaks from each muscle half before and after 5 days display under continuous lighting at 1076 lumen/m<sup>2</sup> of deluxe warm white fluorescent light. Vacuum ageing improved ( $P < 0.05$ ) taste panel tenderness, juiciness and flavour scores reduced Warner-Bratzler shear values and increased total and volatile cooking losses for averages of muscles and feeding regimes. Taste panel flavour scores were lower and drip and total cooking losses were reduced ( $P < 0.05$ ) after vacuum-aged cuts had been displayed for 5 days. Shear force values continued to decline ( $P < 0.05$ ) during display. Initial taste panel tenderness and flavour scores were less desirable for steaks from grass- and short-fed cattle. Vacuum ageing improved ( $P < 0.05$ ) tenderness, juiciness and flavour scores in steaks from grass- and short-fed cattle, but flavour scores were reduced in these steaks after 5 days of display. Shear force values were lowest ( $P < 0.05$ ) in steaks from long-fed cattle. Total cooking and drip losses generally were lowest ( $P < 0.05$ ) in steaks from grass-fed cattle. Vacuum ageing increased ( $P < 0.05$ ) total cooking loss in all steaks except those from the short-fed regime but reduced the variation in total cooking loss across all nutritional regimes. IFT

## 94

Sensory analysis apparatus. I. Specification for wine-tasting glass.

United Kingdom, British Standards Institution  
*British Standard* BS 5586:Part I, 3pp. ISBN 0-580-10249-1 (1978) [En] [2 Park Street, London W1A 2BS, UK]

This standard is identical with ISO 3591:1977 [see FSTA (1977) 9 12U940]. AL

## 95

[Some possibilities of application of rheological methods in quality evaluation of foods.]

Celba, J.

*Prumysl Potravin* 29 (11) 635-638 (1978) [Cs]  
[Vyzkumny Ustav Potravinarskeho Prumyslu, Prague, Czechoslovakia]

The value of objective assessment of food texture, an organoleptically important feature, is emphasized; examples of mechanical tests (bending test to determine brittleness of biscuits), tests of stress relaxation (in quality assessment of crescent rolls and processed cheese), and creep tests (for crescent rolls) in texture evaluation are presented. SKK

## 96

To know with the nose: keys to odor identification.  
Cain, W. S.

*Science, USA* 203 (4379) 467-470 (1979) [11 ref. En]  
[John B. Pierce Foundation Lab. & Yale Univ., New Haven, Connecticut 06519, USA]

Successful odour identification (e.g. in foods) depends on: commonly encountered substances; a long-standing connection between an odour and its name; and aid in recalling the name. The absence of any 1 ingredient impairs performance dramatically, but the presence of all 3 permits ready identification of scores of substances, with performance seemingly limited only by the inherent confusability of the stimuli. AS



## 97

**Parotid salivation in response to tasting wine.**

Hyde, R. J.; Pangborn, R. M.

*American Journal of Enology and Viticulture* 29 (2) 87-91 (1978) [19 ref. En] [Dep. of Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

Parotid salivary flow rates were measured in 10-12 subjects who tasted wines and aqueous solutions containing single and multiple combinations of selected constituents of the wines. Flow rates were significantly less ( $P < 0.001$ ) in response to commercial Chenin Blanc and Pinot Noir than to aqueous solutions containing tartaric acid in the same concn. found in the wines. Salivation was greatest for tartaric acid, followed by tannin, ethanol, or added sucrose. Addition of 11% ethanol significantly depressed salivary responses to tartaric acid in the model systems, in agreement with the masking effects of ethanol on the sour taste of acid, observed in behavioural studies. The potency of tartaric acid in producing salivary flow was lower in the wines than in the model systems, probably because of the buffering capacity of wine in addition to ethanol content. Results demonstrate the potential use of salivary flow measurement as an analytical technique in the sensory evaluation of foods and beverages. AS

## 98

**Sensory characteristics of oysters, clams, and cultured and wild shrimp.**

Edmunds, W. J.; Lillard, D. A.

*Journal of Food Science* 44 (2) 368-373 (1979) [En] [Food Sci. Dep., Univ. of Georgia, Athens, Georgia 30602, USA]

An 18 member panel was used to identify descriptive terms that could be used for the sensory evaluation of oysters, clams and shrimp. 22 descriptive terms were developed for the sensory evaluation of clams and shrimp, and 29 were developed for oysters. The descriptive vocabulary that was developed for shrimp was used to determine sensory differences between wild and cultured shrimp and the effect of size on the sensory properties of shrimp. The cultured shrimp were judged as good or better than wild shrimp. Large shrimp (11-15 g) were scored as having a better texture than small shrimp (3-5 g). IFT

## 99

**[Tasting tests.]**

Jaubert, J. N.

*Bios* 8/9 (12/1) 21-26 (1977/1978) [29 ref. Fr] [Givaudan France, 44 Boulevard du Parc, 92 Neuilly-sur-Seine, France]

Interaction of various factors (colour, texture, temp., aroma and taste) on sensory judgments of food is discussed. Application of sensory analysis to quality control of food manufacture is described in detail, particularly the organization and operation of tasting panels. A panel should consist of an odd number of individuals (5-11, preferably 7), ideally aged 30-35, who are familiar with the food being tested. Methods of training and testing panel members are described; objectives are taste sensitivity, flavour memory, repeatability after intervals, taste recognition when sample appearance is disguised, and ability to ignore

personal tastes. Working methods are elaborated in detail, e.g. suitable accommodation and conditions (tasting cubicles), presentation of samples, choice of test methods, marking scales and recording of results, and avoidance of too many samples (3 ideal). Quite different methods are required for testing market acceptability. Here, tasting should be undertaken by individuals chosen completely at random, having no special aptitudes or knowledge of the product and not sensitive to tasting problems. The panel should be large (min. 49 persons); increasing size gives better extrapolation to the general population. Samples should be presented in familiar surroundings, e.g. dining room or a normal package, with answers requested to a single simple question. ELC

## 100

**[Sensory evaluation of textural properties of gelatin, agar-agar and egg-white gels.]**

Toda, J.; Wada, T.; Konno, A.

*Journal of the Agricultural Chemical Society of Japan [Nihon Nogei Kagakkai-shi]* 52 (11) 539-544 (1978) [7 ref. Ja, en] [Food Res. Lab., Takeda Chem. Ind. Ltd., Osaka, Japan]

Textural characteristics of gel foodstuffs were evaluated using eight 7-point sensory scales corresponding to fundamental textural properties. The scales could be classified as (i) useful for describing differences between gels formed by the same agent, (ii) useful for differentiating between gels of different gelling agents or (iii), both (i) and (ii). Sensory 'hardness' was highly correlated with Texturometer hardness, following Fechner's logarithmic law, and also with breaking strength. Sensory 'brittleness' and 'springiness' were correlated with deformation at the breaking point. Instrumental parameters which correlate with the sensory parameters in category (ii) could not be found for the subjects studied. It is concluded that sensory evaluation under controlled conditions is a valid and useful method for textural characterization of gel foods. [From En summ.] JRR

## 101

**Beer flavour terminology.**Meilgaard, M. C.; Dalglish, C. E.; Clapperton, J. F. *Journal of the Institute of Brewing* 85 (1) 38-42 (1979) [9 ref. En] [Stroh Brewery Co., Detroit, Michigan, USA]

Joint working groups of the European Brewery Convention, the American Society of Brewing Chemists, and the Master Brewer's Association of the Americas have developed a system of flavour terminology to meet the dual needs of enabling brewers to communicate effectively about flavour and naming and defining each separately identifiable flavour note in beer. The system comprises 44 terms to meet the 1st objective while 78 additional terms are suggested for the 2nd. Industry is urged to use this terminology and comment on it. AS

## 102

**[Beer flavour terminology.]** Sammlung beschreibender Ausdrücke für die objektive sensorische Beurteilung von Bier. II.

Meilgaard, M. C.; Dalglish, C. E.; Clapperton, J. F.



*Brauwissenschaft* 32 (2) 33-40 (1979) [9 ref. De, en, fr]  
[Stroh Brewery Co., Detroit, Michigan, USA]  
See preceding abstr.

## 103

**Correlations between quality and pigment parameters in young Beaujolais red wines.**  
Timberlake, C. F.; Bridle, P.; Jackson, M. G.; Vallis, L.  
*Annales de la Nutrition et de l'Alimentation* 32 (5)  
1095-1101 (1978) [5 ref. En, fr] [Long Ashton Res. Sta.,  
Bristol, UK]

The commercial qualities of 15 young Beaujolais wines from 1974 and 1975 were scored by experienced tasters the following summer. Measurements were made: wine colour and the separate contributions to it by the coloured anthocyanins and polymeric pigments; total anthocyanins (coloured + non-coloured); and total pigments - total anthocyanins + total polymers (coloured + non-coloured). All the tasting and analytical data were subjected to regression analysis. Statistically significant correlations were found in both yr between overall quality and contents of total pigments, total anthocyanins, coloured anthocyanins and the tasters mean colour scores; and flavour and the contents of total pigments and total anthocyanins. Thus the colour of the acidified wine (total pigment) was the simplest indication of flavour and quality in these young wines of the same var. and age. In other respects there were marked differences between vintages. In 1974, additional significant correlations were found between overall quality and wine colour, pH and non-coloured anthocyanins; between flavour and colour scores and coloured anthocyanins; and between aroma and total pigments, total anthocyanins, coloured and non-coloured anthocyanins and pH. In 1975 flavour correlated with non-coloured anthocyanins and pH. The results demonstrate the desirable effects of anthocyanins on quality. AS

## 104

**Descriptive sensory analysis of whisky flavour.**  
Piggott, J. R.; Jardine, S. P.  
*Journal of the Institute of Brewing* 85 (2) 82-85 (1979)  
[30 ref. En] [Dep. of Food Sci. & Nutr., Univ. of  
Strathclyde, Glasgow G1 1SD, UK]

A descriptive vocabulary of 35 terms was compiled for whisky. Odour, flavour and after-flavour were separately assessed on 5-point scales. After 2 sets of flavour profiles of 10 whiskies had been collected, the assessors were given a period of training, during which they familiarized themselves with chemical standards used to define the descriptive terms. Finally, another 2 sets of profiles were collected. Training was found to improve reproducibility and discrimination. Odour or flavour descriptors alone were sufficient to distinguish between whiskies, and odour and flavour terms together provided little more information than odour alone. AS

## 105

**Effect of time and temperature of storage after cooking on the sensory quality of Bintje potatoes.**  
Lundgren, B.; Karlström, B.; Ljungqvist, A.-C.  
*Journal of the Science of Food and Agriculture* 30 (3)  
305-318 (1979) [5 ref. En] [SIK, Swedish Food Inst.,

Fack S-400 23 Göteborg, Sweden]

17 trained judges used a scoring technique with 9-point scales to evaluate sensory attributes of cooked potatoes (var. Bintje) that had been kept hot after cooking for different lengths of time at different temp. Max. storage times before the potatoes were considered unacceptable were determined for each temp. In addition, comparisons were made with preference data obtained for 55 untrained consumers. For all sensory attributes significant differences in average scores were obtained among samples stored for different periods of time (0, 1, 2, 3 and 4 h) and different temp. (60, 75 and 90°C), as well as significant interactions between time and temp. In general the effect of time was largest at the highest temp. Differences were largest for flavour and smallest for appearance. The max. times potatoes could be kept at 60, 75 and 90°C before becoming unacceptable in flavour were 2.9, 2.2 and 1.3 h, resp. Corresponding values for texture and appearance were higher. Generally potatoes that had been kept hot were described as 'dark, greyish or brownish, and dry on surface', and having 'strong and musty odour; musty, old and bitter flavour, and watery, soggy, and spongy texture'. For 55 untrained consumers, (highly) significant differences were obtained in preference frequencies for appearance, flavour, and texture for pairs of samples stored after cooking at 75°C for different periods of time. The differences were largest for flavour, and smallest for appearance. Generally, the freshly prepared sample was preferred, and the difference in preference increased with increased storage time. Results from the untrained consumers are in close agreement with results obtained by the trained panel. It was concluded that consumers in general also consider the sensory changes of keeping potatoes hot after cooking as deleterious, and that unacceptability limits determined by the trained panel were not unreasonably small. AS

## 106

**Swiss cheese flavor. II. Organoleptic analysis.**  
Biede, S. L.; Hammond, E. G.  
*Journal of Dairy Science* 62 (2) 238-248 (1979) [21 ref. En] [Dep. of Food Tech., Iowa State Univ., Ames, Iowa 50011, USA]

7 Swiss cheeses and the oil-soluble, water-soluble volatile, and water-soluble non-volatile fractions isolated from them were evaluated by the flavour profile method. The intensities of 9 perceived flavour notes were correlated with analytical values of some flavour components. In the water-soluble volatiles, acidity, sweetness and lipolysed flavour were correlated with total free acids, diacetyl and butyric acid, resp. Synthetic mixtures of acetic, propionic and butyric acids, diacetyl and ammonia reproduced the flavours of the isolated fractions. In the water-soluble non-volatiles, acidity could not be correlated with lactic acid or pH, but it was correlated with the amounts of small peptides and amino acids. The sweetness of the water-soluble non-volatiles depended on the interaction of Ca and Mg ions with small peptides and amino acids. Small peptides and amino acids also were responsible for the brothy-nutty flavour of this fraction. The burned and bitter flavour of the water-soluble non-volatiles was attributed to medium sized (tri to hexa) peptides. The nutty and volatile flavours of the oil-solubles were



caused primarily by free fatty acids. Neutral oil-soluble compounds seemed to suppress the perception of lipolysis, and in excess to cause an undesirable 'fermented' flavour. The flavour of whole cheese could not be predicted from those of its fractions. In whole cheese, sweet, nutty and volatile flavours correlated with dipeptides, burned flavours with lactic acid, and volatile flavours with acetic acid. The acid flavours correlated with the % of water-insoluble fatty acids in the aqueous portion of the cheese. [See preceding abstr. for part. I.] AS

## 107

**Taste panel evaluation of pond-fattened school prawns *Metapenaeus macleayi* (Haswell).**

McBride, R. L.; Maguire, G. B.

*Aquaculture* 16 (3) 261-265 (1979) [6 ref. En] [Div. of Food Res., CSIRO, North Ryde, NSW 2113, Australia]

Juvenile school prawns were collected from the Clarence River, NSW, Australia and fattened in artificial ponds. After harvest these prawns were assessed by taste panels along with other samples of the same species collected from estuarine fisheries in NSW. Taste panels could not detect any significant differences between pond-fattened and wild prawns and both were found to be highly acceptable. AS

## 108

**The relationship between odor and flavor.**

Kingston, B. H.

*Perfumer & Flavorist* 3 (4) 41-44 (1978) [8 ref. En] [Proprietary Perfumes Ltd., Ashford, Kent, UK]

This lecture discusses the meaning of odour and flavour and their physiological relationship. Some of the techniques used for sensory evaluation of a flavour complex are illustrated using an artificial peach flavour blend. RM

## 109

**Taste.**

Boudreau, J. C.

*Technical Quarterly, Master Brewers' Association of the Americas* 15 (2) 94-101 (1978) [41 ref. En, es] [Sensory Sci. Cent., Graduate School of Biomed. Sci., Univ. of Texas, Houston, Texas, USA]

A definition of taste is given and the physiology of taste perception is described. The taste of beer is discussed with respect to beer chemistry and the chemical sensory neural systems activated. SP

## 110

**Salivary secretion in response to mastication of crisp bread.**

Pangborn, R. M.; Lundgren, B.

*Journal of Texture Studies* 8 (4) 463-472 (1977) [13 ref. En] [Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

Using a precision sialometer, unilateral parotid saliva was collected from 6 subjects while they masticated and swallowed pieces and powders from 4 types of Swedish crisp breads. Significantly more saliva was required for oral manipulation of the powders than for the corresponding pieces, as the greater surface area of the

former required more saliva for lubrication in preparation for deglutition. Significant differences were observed in response to the 4 types of bread, related to both their texture and their taste. Despite wide among-subject variation in the amount of saliva secreted, there was agreement in all cases on the direction of the response. The results indicate that the measurement of the relation between the amount (and possibly the composition) of saliva secreted and the texture and chemical properties of foods can be quantitated, and merits further investigation. AS

## 111

**Force-deformation conditions associated with the evaluation of brittleness and crispness in selected foods.**

Sherman, P.; Deghaidy, F. S.

*Journal of Texture Studies* 9 (4) 437-459 (1978) [36 ref. En] [Dep. of Food Sci., Queen Elizabeth Coll., Univ. of London, Campden Hill Road, London W8 7AH, UK]

The brittleness and crispness of low moisture foods and the crispness of selected high moisture foods were evaluated both instrumentally by Instron fracture tests and using a sensory panel. Brittleness was evaluated sensorially during the 'first bite' whereas crispness was identified at a later stage of mastication. The max. force at fracture of low moisture foods correlated inversely with panelists' evaluations of brittleness either in the mouth or using the fingers. Panelists' evaluations of crispness in the mouth correlated reasonably well with the initial linear portion of the Instron force-deformation curves when the samples were supported near their ends and also in their middle regions. The shapes of the force-deformation curves for high moisture foods were very much influenced by the way in which samples were supported in fracture tests, the method of fracture and the Instron crosshead speed. AS

## 112

**Liquid texture perceived in the mouth.**

Kokini, J. L.; Kadane, J. B.; Cussler, E. L.

*Journal of Texture Studies* 8 (2) 195-218 (1977) [39 ref. En] [Dep. of Chem. Eng., Carnegie-Mellon Univ., Pittsburgh, Pennsylvania 15213, USA]

Statistical analysis of subjective assessments obtained by ratio scaling suggested that a 10 attribute vocabulary (thick, gummy, heavy, thin, light, sticky, slippery, creamy, slimy and smooth) describing liquid texture in the mouth could be reduced to a smaller number without great loss of predictive power. 3 attributes 'thickness', 'smoothness', and 'slipperiness', which could best predict the remaining 7 were selected for further study. Each attribute was found to be closely related to a specific force in the mouth. 'Thickness' was shown to be proportional to the viscous force between the tongue and the roof of the mouth. 'Smoothness' seemed to be inversely proportional to the frictional force caused by the contact between the tongue and the mouth. 'Slipperiness' was shown to be inversely proportional to a known average of viscous and frictional forces. AS



## 113

**Contributions to the development of sensory evaluation methods. I. Recognition tests with aqueous sodium chloride solutions of different concentration.**

Kulcsar, F.; Falusi, Z.; Kovacs, J.

*Acta Alimentaria* 7 (4) 271-277 (1978) [17 ref. En]

[Cent. of Food Control & Analysis, Min. of Agric. & Food Ind., H-1051 Budapest, Guszev u. 25, Hungary]

Members of sensory evaluation panels are usually selected on their taste threshold and ability to recognize different tastes, but facility to memorize taste intensity from comparison with previous tests is more difficult to acquire. Sensory response of 5 experienced judges to salty taste was examined with NaCl solutions ranging from mild (0.02%) to very intense (0.14%), in 3 series covering 3, 4 and 5 different concn. Solutions were tasted and differences identified by panel members, then presented one by one on the following day for memorized identification of concn. (progressing from 3 to 5 different concn.). In addition, difference tests were also applied (paired comparison, triangle, and tetra tests). Results are tabulated. In memory tests panel members could recall concn. correctly for differences of 0.03%. Difference tests were more sensitive (particularly paired comparison) and achieved finer differentiation as low as 0.1%. Mistakes were most frequent at medium concn. ELC

## 114

**Use of rheological terms and correlation of compatible measurements in food texture research.**

Mohsenin, N. N.; Mittal, J. P.

*Journal of Texture Studies* 8 (4) 395-408 (1977) [En]

[Dep. of Agric. Eng., Pennsylvania State Univ., University Park, Pennsylvania 16802, USA]

The importance of maintaining the purity of rheological terms and using them only when measurements and definitions are in accordance with the accepted rheological definitions is pointed out. It is shown that if rheological terms and methods of measurements and analyses are used correctly, they can be employed in food texture studies even though conditions upon which the theory is based are not fully met. It is proposed that the term "modulus of elasticity" be replaced by the term "modulus of deformability" which considers both recoverable and unrecoverable deformations that often take place when a food sample is subjected to even very small strains. It is also submitted that mechanical properties reflecting the behaviour of the material under small strains do not necessarily correlate significantly with mechanical properties which reflect the yielding and fracturing or failure of the material. Published data are examined to test the validity of this hypothesis. In general, correlations between well-defined failure type instrumental tests and panel tests are good, whereas correlations between small-strain instrumental tests and panel tests are poor. AS

## 115

**[Sensory analysis: a glossary with explanations.]**

Drake, B.; Lindgren, B.

*SIK Rapport* No. 431, 83pp. (1978) [Sv] [SIK - Svenska Livsmedelsinst., Fack, S-400 23 Göteborg, Sweden]

This glossary covers 832 terms of significance for sensory analysis. Each entry comprises the Swedish term, the corresponding English term, and a definition and/or explanation in Swedish. Appendices give common mathematical symbols, prefixes of Greek or Latin origin, and a list of terms covered, classified by aspect (general aspects, physiology and anatomy, psychology, psychophysics, sensory properties, statistics and mathematics, test methods, complications, and personnel aspects). AJDW

## 116

**[Rao's sequential analysis and its application to selection of taste panellists for sensory testing.]**

Shirose, I.

*Boletim do Instituto de Tecnologia de Alimentos,*

*Brazil* No. 52, 11-24 (1977) [5 ref. Pt, en] [Inst. de Tecnologia de Alimentos, Avenida Brasil 2880, Caixa Postal 139, Campinas-CEP 13.100, Sao Paulo, Brazil]

The sequential analysis procedure of Rao [Sankhya (1950) 10 (4) 361-370] is discussed, together with its modification by Lombardi for testing the parameters of a binomial population. Application to selection of panellists for sensory testing programmes (on the basis of the potential panellist's performance in tasting trials) is described, with the aid of examples illustrating application of the method to the duo-trio and triangle tests. AJDW

## 117

**Textural characterization of texturized proteins.**

Breene, W. M.

*Journal of Texture Studies* 9 (1/2) 77-107 (1978)

[many ref. En] [Dep. of Food Sci. & Nutr., Univ. of Minnesota, St. Paul, Minnesota 55108, USA]

Sensory and instrumental tests employed for characterizing the texture of texturized plant proteins and their combinations with meat are reviewed. This methodology has borrowed heavily from that evolved for meat and, similarly to the studies on meat, has emphasized 2 parameters: toughness/tenderness and juiciness. Although it appears that this 2-parameter approach may be adequate, multiple-parameter instrumental testing should be continued in order to provide a data bank for the selection of the most accurate, reproducible and simplest measurements. It is suggested that researchers working in the commodity areas should make fuller use of the texture methodology literature. AS

## 118

**Making a quality product from tar heel muscadines.**

Carroll, D. E.

*Research and Farming* 37 (1/2) 13 (1978) [En] [Agric. Exp. Sta., N. Carolina State Univ., Raleigh, N. Carolina 27607, USA]



The laboratory manufacture of muscadine sparkling wine is described using a sparkling wine stock of low alcohol content (approx. 11% by vol.) prepared from the appropriate muscadine cv. The muscadine sparkling wines produced by this method were well received by technical taste panels. In an evaluation of coded samples, the panels rated the quality of sparkling wines produced from several muscadine cv. as being competitive to that of highly-successful commercial champagnes from California and New York State. SP

## 119

[Analysis of the western type alcoholic beverages presented to the 16th contest.]

Hara, T.; Yoshizawa, K.; Totsuka, A.; Momose, H.; Ishikawa, T.; Iimura, Y.; Otsuka, K.

*Report of the Research Institute of Brewing [Jozo Shikenjo Hokoku]* 150, 28-34 (1978) [Ja, en] [Nat. Res. Inst. of Brewing, Kita-ku, Tokyo, Japan]

White wines (48 samples), red wines (38), rose wines (6), sweet white wines (5), sweet red wines (8), other wines (12), vodka (1), rum (1), special grade whiskies (16), 1st grade whiskies (10), 2nd grade whiskies (8), special grade brandies (10), 1st grade brandy (1), 2nd grade brandy (1), liqueurs (25), plum liqueurs (7) and medicinal wines (6) were presented at the 16th contest. Their sensory evaluation and some components are listed. YN

## 120

Prediction of panel preference for Zinfandel wine from analytical data: using difference in crop level to affect must, wine and headspace composition.

Cordner, C. W.; Ough, C. S.

*American Journal of Enology and Viticulture* 29 (4) 254-257 (1978) [20 ref. En] [Dep. of Viticulture & Enology, Univ. of California, Davis, California 95616, USA]

Moderate success was achieved by multiple regression analysis in relating sensory preference data, for a group of semi-experienced judges, to must, wine, and headspace analyses. Multiple coeff. of detn. were about 70% for all 3 analyses. The treatments imposed, crop levels, had an effect on the judges; the lighter crop yielding wines were preferred in both taste and overall flavour. Whether the differences in quality are justified in loss of crop remains to be determined. AS

## 121

[Effects of O<sub>2</sub> concentration in the pack headspace and storage temperature on the quality of instant coffee.]

Quast, D. G.; Okada, M.; Miya Mori, E. E.; Lima, J. E. *Boletim do Instituto de Tecnologia de Alimentos, Brazil* No. 52, 81-89 (1977) [5 ref. Pt, en] [Inst. de Tecnologia de Alimentos, Avenida Brasil 2880, Caixa Postal 139, Campinas-CEP 13.100, Sao Paulo, Brazil]

Samples of spray-dried or freeze-dried instant coffee were packaged in 0.5 l. cans (each containing approx. 80 g instant coffee) with headspace O<sub>2</sub> concn. of 0, 2 or 21%, and stored for 0, 3, 6, 9 or 12 months at -10°C, ambient temp. (approx. 23°C) or 30°C. After storage, the coffee quality was evaluated organoleptically by trained

and non-trained panellists. Tables of results are given, and discussed in detail. Quality scores tended to decrease during storage; effects of headspace O<sub>2</sub> concn. and storage temp. on quality were variable, and differences were relatively small. It is therefore concluded that neither headspace O<sub>2</sub> concn. nor storage temp., over the range tested, were major factors influencing deterioration of the organoleptic properties of instant coffee during storage. Some tasters detected a 'varnish' off-flavour in the coffee samples, probably attributable to the lacquer applied to the can or lid interior. AJDW

## 122

[Flavour of bread crumb: application of sensory analysis to demonstrate differences in flavour according to breadmaking techniques.]

Launay, B.; Hourne, M.

*Bulletin des Anciens Eleves de l'Ecole Francaise de Meunerie* No. 288, 293-299 (1978) [10 ref. Fr] [Ecole Nat. Supérieure des Ind. Agric. & Alimentaires, 1, rue des Olympiades, 91305 Massy, France]

Triangular tests to determine ability to distinguish between bread samples on the basis of odour, aroma and taste were carried out with a total of 15 tasters. In the tests, samples of fresh bread or thawed deep-frozen bread were used, which were produced using different flours or kneading methods, with and without added salt, or employing different yeast contents, bread from different bakeries, and breads manufactured using differing combinations of yeast and starter or made with or without controlled rising. The results are tabulated. Successful distinction was made between breads differing in most of these respects, but care should be taken not to overemphasize the indications obtained. The texture of the samples could not be excluded as a factor assisting differentiation. The responses relating to yeast % are, however, considered to be particularly indicative. MJD

## 123

[Survey of methods for long term storage of poultry eggs. XII. Proportional parts, amounts of major chemical constituents and interior quality of fresh and stored Khaki Campbell duck eggs.]

Tanabe, H.; Ogawa, N.

*Japanese Poultry Science [Nihon Kakin Gakkai-shi]* 15 (1) 18-24 (1978) [10 ref. Ja, en] [Dep. of Human Nutr. & Food Sci., Gifu Women's Coll., Taromaru, Gifu 501-25, Japan]

Proportions of the parts, major chemical constituents, palatability and interior quality of fresh and stored Khaki Campbell duck eggs were checked and compared with those of White Leghorn hens' eggs. Ducks and hens were 7 months old and individually housed. Selected characteristics of the fresh duck eggs were (mean of 20 eggs  $\pm$  s.e.): egg wt. 62.72  $\pm$  0.91 g; albumen wt. 35.16  $\pm$  0.52 g; yolk wt. 21.01  $\pm$  0.41 g; shell wt. 6.55  $\pm$  0.18 g; shell thickness 0.407  $\pm$  0.002 mm; albumen moisture 88.29  $\pm$  0.15%; albumen crude protein 8.77  $\pm$  0.23%; albumen crude fat 0.13  $\pm$  0.03%; albumen crude ash 0.53  $\pm$  0.02%; yolk moisture 44.39  $\pm$  0.17%; yolk crude protein 15.26  $\pm$  0.53%; yolk crude fat 38.03  $\pm$  0.73%; yolk



crude ash  $1.45 \pm 0.03\%$ ; albumen height  $8.45 \pm 0.28$  mm; yolk height  $19.73 \pm 0.26$  mm; and albumen pH  $7.77 \pm 0.03$ . No statistically significant difference in palatability between boiled duck and hens' eggs was found using a triangle difference test. Significantly higher internal quality measures, such as albumen height, albumen index and yolk height, were observed in duck eggs than in hens' eggs, when they were stored in a box kept at  $25^{\circ}\text{C}$  for 5, 10, 20, 30, 40 and 80 days. [See FSTA (1979) 11 4Q50 for part XI and following abstr. for part XIII.] AS

## 124

**The influence of cooking temperature on the eating quality of beef from bulls and steers fed three levels of dietary roughage.**

Hawrysh, Z. J.; Price, M. A.; Berg, R. T.  
*Canadian Institute of Food Science and Technology Journal* 12 (2) 72-77 (1979) [26 ref. En, fr] [Food & Nutr. Div., Univ. of Alberta, Edmonton, Alberta, Canada T6G 2M8]

Cooking losses and subsequent eating quality of semimembranosus (SM) roasts obtained from bulls and steers fed 3 levels of dietary roughage (20, 50 and 80% alfalfa-brome hay) were determined. Evaluations were conducted by dry heat roasting at  $121^{\circ}$  and  $163^{\circ}\text{C}$  to  $63^{\circ}\text{C}$  internal temp. Cooking losses of SM roasts were affected by cooking temp. but not by level of dietary roughage or castration. Subjective evaluation by a trained panel indicated that SM roasts cooked at  $121^{\circ}\text{C}$  were significantly better in texture, softness, juiciness, flavour, tenderness, residual connective tissue and overall acceptability than comparable samples cooked at  $163^{\circ}\text{C}$ . Objective measurements of juiciness (water holding capacity, WHC) and tenderness for SM roasts supported the findings from sensory evaluations. Trained panelists indicated that SM roasts from animals on all roughage levels were similar in eating quality. There were no significant differences in WHC, Warner Bratzler (WB) shear and penetrometer data attributable to roughage levels: Ottawa Texture Measuring System (OTMS) data indicated that samples were more tender from the 20% than the 80% roughage group. SM roasts from steers were subjectively rated significantly better in texture, tenderness and connective tissue than comparable samples from bulls: roasts from both 'sexes' were similar in all other quality characteristics evaluated. Roasts from bulls had greater WHC than those of steers. There were no significant differences in WB shear force values and penetrometer data attributable to sex: OTMS data indicated that SM roasts from steers were more tender ( $P < 0.01$ ) than comparable roasts from bulls. Thus, (i) dry heat roasting of a less tender cut at  $121^{\circ}\text{C}$  to  $63^{\circ}\text{C}$  resulted in a better product than that of comparable roasts cooked at  $163^{\circ}\text{C}$ ; (ii) beef from animals fed varying levels of dietary roughage was similar and acceptable; and (iii) beef from bulls may be less tender than from steers; however, beef from all animals was judged acceptable in eating quality. AS

## 125

**[Investigations on possible routine boar fattening and improved sensory detection of boar odour.]**

Untersuchungen zur Möglichkeit einer routinemässigen

Jungebermast und Versuche zur Verbesserung des sensorischen Nachweises geschlechtsbedingter Geruchsabweichungen.

Wachelau, G.; Reuter, G.

*Schlachten und Vermarkten* 78 (10) 327-333; (11) 363-372 (1978) [many ref. De, en, fr]  
[Brümmelstrasse 10, 1000 Berlin 33]

156 young boars fattened to live wt. of 80-95, 95-110, 110-125 and 125-140 kg were examined for androstenone concn. and boar taint, using 10-20 g rendered fat (back fat and kidney fat) and evaluations by a veterinarian, a testing panel and a consumer test. 117 animals (75%) of all the wt. groups contained  $\leq 0.5$   $\mu\text{g}$  androstenone/g fat, and only 14  $> 1$   $\mu\text{g/g}$  (also spread between wt. classes). Though there was a slight trend towards higher concn. with increasing carcass wt., no relation with age was observed. Commercial carcass grading showed carcass grades of boars to be somewhat inferior to those of barrows and gilts: up to live wt. 120 kg, Class E was only rarely achieved. Official objections to carcasses with boar taint were 15.4% for all animals, 12% for carcass wt.  $\leq 80$  kg. No sensory defects were observed in meat from boars  $\leq 80$  kg carcass wt. and 0.5  $\mu\text{g/g}$  androstenone concn. Consumer tests revealed that most consumers did not detect low levels of boar taint. Routine inspection of suspect carcasses by backfat rendering with the hot iron technique and 2 trained testers and confirmatory tests by laboratory rendering of samples from chilled carcasses are proposed. RM

## 126

**[Sensory test methods — handling of samples and general technical specifications.]**

Hungary, Magyar Szabványügyi Hivatal

*Hungarian Standard MSZ 7304/3-78*, 4pp. (1978) [Hu]

## 127

**[Sensory test methods — sensory test personnel.]**

Hungary, Magyar Szabványügyi Hivatal

*Hungarian Standard MSZ 7304/4-78*, 3pp. (1978) [Hu]

This standard partially supersedes MSZ 12251-52  
SP

## 128

**[Sensory evaluation of foods.]** Sensorische Erfassung und Beurteilung von Lebensmitteln. [Book]  
Raunhardt, O.; Escher, F. (Switzerland, Schweizerische Gesellschaft für Lebensmittel-Wissenschaft und -Technologie; Switzerland, Eidgenössische Technische Hochschule, Institut für Lebensmittelwissenschaft) (Editors)

109pp. (1977) [many ref. De, en] Zürich, Switzerland; Forster-Verlag AG Price \$24.00; FS44.50

This volume represents an advanced study course issued on behalf of the Swiss Society of Food Science & Technology. Individual sections are as follows. Sensory analysis and evaluation of foods — a general introduction, by J. Solms (pp. 9-19, De, 41 ref.). Sensory perception and sensory science, by H. Moll (pp. 20-31, De, 21 ref.). How we evaluate foods sensorically, by H. R. Moskowitz (pp. 32-53, En, 30 ref.). Practical approaches and types of tests in evaluating foods, by



M. Vaisey (pp. 54–64, En, 30 ref.). Practical experience in the sensory evaluation of fruit juices and fruit beverages, by H. U. Daepf (pp. 65–75, De, 21 ref.). Practical experience in the sensory evaluation of confectionery: the aroma index, by J. Kleinert (pp. 76–96, De, 7 ref.). Practical experience in the sensory evaluation of cheese, by G. Burkhalter (pp. 97–104, De). Practical experience in the sensory evaluation of dried soups and prepared meals, by C. Herrmann (pp. 105–109, De). HBr

## 129

[Sensorily active compounds of yeast hydrolysates.] (In 'Zbornik prednasok z III. celostatneho Sympozia o aromatickych latkach v pozivatinach' [see FSTA (1979) 11 11A775]) [Lecture]

Velisek, J.; Hajslova, J.; Davidek, J.  
pp. 45–55 (1977) [7 ref. Cs] [Katedra Chemie a Zkouseni Potravin, Vysoke Skole Chem. Tech., Prague, Czechoslovakia]

Netherlands dried Gistex X-II yeast hydrolysate and Czechoslovak paste and dried hydrolysates with or without salt were examined organoleptically by a panel for odour of aqueous 0.1–5.0% solutions; they were also extracted with different solvents and examined by GLC on polar and non-polar stationary phases. In general, the odour properties varied from preparation to preparation, the intensity of a caramelized odour increasing with increase in intensity of heat treatment. Phenylacetic and phenylpropionic acids, and also acetic acid and other aliphatic fatty acids (including propionic, butyric and valeric acids) were mostly responsible for the caramelized odour. 2,3-butanediol, benzyl alcohol and thiamin breakdown products were detected in the neutral fraction; indole and skatole were the sensorily outstanding products in the basic fraction, which also included thiamin breakdown products. SKK

## 130

[Present knowledge on organoleptic properties of beer.]

Moll, M.; Vinh, T.; Flayoux, R.  
*Annales de la Nutrition et de l'Alimentation* 32 (5) 1035–1049 (1978) [many ref. Fr, en] [TEPRAL, 2 Rue Gabriel Bour, 54250 Champigneulle, France]

The subject is reviewed in 3 sections: section 1, tasting procedures: as there is no standard nomenclature, each brewery has devised its own. 4 organisations, the European Brewery Convention (EBC), the American Society of Brewing Chemists (ASBC), the Master Brewers Association of America (MBAA) and the Institute of Brewing have collaborated to produce a standard beer tasting terminology for international use. Various tasting procedures and their statistical interpretation are discussed (i.e. paired comparison and triangular test). Section 2, threshold values of some compounds: several hundred beer constituents and their threshold values in certain types of beer were studied [FSTA (1976) 8 10H1671]. Particular methods of tasting were tried to determine precisely the threshold value of a pure compound in beer. Section 3, correlation between the tasting results and physicochemical properties of beer: the application of statistical regression analysis to tasting results and

physicochemical properties allowed the importance of some constituents for the beer quality to be estimated. AS

## 131

[Sensory evaluation of drinking waters.] (In 'Zbornik prednasok z III. celostatneho Sympozia o aromatickych latkach v pozivatinach' [see FSTA (1979) 11 11A775]) [Lecture]

Kulhavy, T.  
pp. 39–44 (1977) [9 ref. Cs] [VU Upravy Vod pri n.p. CKD Dukla, Prague, Czechoslovakia]

The requirements of Czechoslovak standards CSN 83 0611 on drinking water and CSN 83 0505 on determination of water odour are considered. On their basis, taste at defined concn. of  $\text{CaCl}_2$ ,  $\text{MgSO}_4$ ,  $\text{NaHCO}_3$ , pH and  $\text{CO}_2$ ; taste spectra of 19 inorganic salts and 33 combinations between them classified into 6 intensity grades; and hedonic evaluation of 23 combinations of inorganic salts were examined. A method for evaluation of quality, intensity and pleasurable-ness of taste perception in drinking waters is outlined; and threshold, optimal and max. sensory concn. of main inorganic ions forming the mineral contents of drinking waters were determined. SKK

## 132

[Statistical analysis of taste-scoring of 34 wines from grapes of 27 varieties grown in the Upper Mosel region of the Federal Republic of Germany. I. Studies of the reliability and similarity of evaluations and differentiation of the wines and criteria.] Statistische Analyse einer mittels "Bewertender Prüfung mit Skala (Scoring)" durchgeführten Testweinprobe mit 34 Weinen von 27 verschiedenen Rebsorten, angebaut im Gebiet der Oberen Mosel. I. Untersuchungen zur Verlässlichkeit und Gleichartigkeit der Urteile sowie zur Unterscheidbarkeit der geprobten Weine und deren Kriterien.

Weiling, F.; Schöffling, H.; Unger, C.  
*Mitteilungen Klosterneuburg, Rebe und Wein, Obstbau und Fruchteverwertung* 28 (5/6) 185–213 (1978) [16 ref. De, en, fr] [Inst. für Landwirtschaftl. Botanik-Biometrie, Univ. Bonn, D-5300 Bonn, Meckenheimer Allee 176, Federal Republic of Germany]

97 participants at a meeting for comparative planting tests also took part in taste tests of wines made from var. of grapes registered for winemaking, and from 4 new growths. All wines are planted in the Upper Mosel region, and musts were prepared there to facilitate comparisons. Wines (mainly from the 1975 vintage) were tasted in the order 'neutral', 'fragrant' and 'aromatic' and the overall impression was scored on a 10-point scale. Analysis of variance was performed on the raw data using a 2-way classification model with parameters 'wines' and 'testers'. Testers and wines were each classified into 4 groups by analysing the interactions wines  $\times$  testers on the basis of distribution of individual scores round the linear regression share and the coeff. of regression of this linear regression share. These statistical groups were compared with a grouping of testers into 5 groups made on the basis of their professional relation to wine testing. Scores made



by the statistically-formed groups differ significantly from those of 'commercial' groups, and overall evaluation can differ depending on chance composition of tasting groups. For all groups, data given include ranges of scores, and confidence interval for mean score of wine. It is also shown that for differentiation between 2 wines it is necessary to use not only the difference of the mean scores coupled with the confidence interval, but also the correlation coeff. from the scoring by the testers. The correlation coeff. becomes a more exact criterion as the number of testers increases. Correlation coeff. are given for 561 pair comparisons of wines, the respective confidence intervals for all testers, and all reliable testers (77 of 97), and it is shown that pair comparisons between testers can be made. Suggestions for improving similar tests are discussed. DIH

### 133

**[Possible causes of influences on wine fermentation and taste.]** Mögliche Ursachen von Gär- und Geschmacksbeeinflussungen bei Wein.

Eichhorn, K. W.; Lorenz, D. H.

*Deutsche Weinbau* 33 (13) 504, 506, 511-514 (1978)

[8 ref. De] [Landes-Lehr- & Forschungsanstalt für Landwirtschaft, 6730 Neustadt an der Weinstraße, Federal Republic of Germany]

Influences of plant protection chemicals and of use of grapes infected with mould on course of fermentation and final quality of wine were investigated. Late application of anti-botrytis fungicides can inhibit natural grape yeast, causing slow fermentation and enabling unwanted fermentations to take place. Fermentation rates of musts from treated and untreated grapes with and without addition of pure culture yeast are displayed graphically. Use of pure culture yeast overcomes the problems caused by fungicides. No direct effect of fungicide on wine taste has been noted. Influence of use of rotten grapes on wine quality is discussed with reference to *Trichothecium roseum*, *Penicillium*, *Alternaria*, *Mucor* and *Rhizopus*. Silvaner wine was blended with wine made from *Penicillium*-rotted grapes; the unblended normal wine received an overall sensory score of 93.5 on a scale of 100, with addition of 5% *Penicillium*-wine this was reduced to 72.0, and the *Penicillium* wine evaluated alone had a score of 4.0 (undrinkable). DIH

### 134

**Consumer evaluation of the inter-relationships between the sensory components of commercial orange juices and drinks.**

Ennis, D. M.; Keeping, L.; Chin-Ting, J.; Ross, N.

*Journal of Food Science* 44 (4) 1011-1012, 1016 (1979)

[5 ref. En] [Dep. of Food Sci., Univ. of Guelph, Guelph, Ontario, N1G 2W1, Canada]

15 orange beverages in 4 classes (dry formulations, frozen, canned, and bottled) were evaluated by 630 consumers for sensory characteristics. Considering preference, dry orange drink formulations compared favourably with frozen juices and sweetened canned juices and rated higher than unsweetened canned juices and one of the bottled juices. Analysis of the sensory

components influencing preference revealed that sweetness and appearance had a major influence on preference with dry beverage formulations, but since these 2 sensory characteristics were found to be very highly correlated ( $r = 0.94$ ) only one of them, sweetness, was required to predict preference. In the case of the canned juices, sourness had the greatest influence on preference, while frozen juice preference was influenced by the product of sweetness and sourness. IFT

### 135

**[Comparison of methods for determining the boiling quality of beans.]**

Kolarova, M.

*Rasteniev'dni Nauki* 15 (6) 48-54 (1978) [14 ref. Bg, ru, en] [Inst. po Semeznanie, Sortopodd"rzhane i Bobovi Kulturi "Obraztsov Chiflik", Ruse, Bulgaria]

The methods of Sosnin [Izvestiya Gosudarstvennogo Instituta Opytnoi Agronomii (1972) 5 (5)] and Popov [Trudy MTIPP (1957) Vol. 9] were compared for 12 var. of bean. The former was rejected in view of the faulty criterion for assessing the moment of complete boiling of the bean; the latter, involving 6 replicate tests using 60 g beans and the POR-1 apparatus, with sensory assessment of the moment of boiling (after 132.83-178.66 min), was considered superior. Even better results were obtained when the sensory assessment was supplemented by the mechanical resistance of the beans as determined by finometer. HBr

### 136

**[Results of investigations on influences of different factors on judgement of sensory quality of apples.]**

Ergebnisse von Untersuchungen über die Einflüsse verschiedener Faktoren auf die Beurteilung der sensorischen Qualität von Äpfeln.

Zanon, K.

*Mitteilungen Klosterneuburg, Rebe und Wein, Obstbau und Früchteverwertung* 28 (5/6) 214-226 (1978) [36 ref. De, en, fr] [Versuchszentrum für Land- & Forstwirtschaft Laimburg, I-39040 Auer, Italy]

Using analysis of variance the influence of the factors 'group of tasters' (2 groups of laymen and 2 groups of experts) 'location' (Laimburg, Kastelbell, Meran, Ferrara, Angers & Innsbruck) and 'method of storage' (cold storage and controlled atm (CA)-storage) on the judgements of tasters for sensory characteristics (appearance, solidity, juiciness, taste, sugar:acidity ratio and general impression) of 4 var. of apples (Morgenduft, Starking Delicious, Jonathan and Golden Delicious) was examined. Then mean values were compared ( $\alpha = 0.05$ ) whenever there was a significant influence of a factor gained from the analysis of variance and the following F-test. The results show that between the judgements of the groups of experts there were in only 33% of cases no significant differences, in approx. 58% of cases, experts from Karlsruhe judged the characteristics with a higher number of points than those from S. Tyrol. Also in the groups of laymen there were in only approx. 35% of the cases no significant differences, in 65% of the cases laymen from Karlsruhe judged the characteristics better than laymen from S. Tyrol. With var. Jonathan the factor 'location' had no influence on



examined characteristics. With other examined var. significant differences could be noticed mainly with characteristics 'appearance' and 'general impression'. Fruits of locations from S. Tyrol proved superior to those from other locations. Furthermore the examinations showed that sensorial characteristics 'solidity' and 'juiciness' of CA-stored fruits were judged significantly better than those of fruits from cold storage. AS

### 137

[Results of simple correlation analyses of physical, chemical and sensory characteristics of apples.]  
Ergebnisse einfacher Korrelationsanalysen physikalischer, chemischer und sensorischer Merkmale von Äpfeln.  
Zanon, K.

*Mitteilungen Klosterneuburg, Rebe und Wein, Obstbau und Früchteverwertung* 28 (5/6) 227-237 (1978) [24 ref. De, en, fr] [Land- & forstwirtschaftliches Versuchszentrum Laimburg I-39040 Auer, Italy]

Taking into account different origins and 2 methods of storing (cold storage and storing in controlled atm physicochemical analyses and sensory tests for several yr were carried out with 4 var. of apples (Golden Delicious, Morgenduft, Starking Delicious, Jonathan). The data achieved were examined with regard to their possible correlations. The significant correlations with the physicochemical results of the analyses were not sufficient to permit recommendation of ranges of application; however, simplification of the sensory judging of quality may be derived from correlations within the sensory judgements and between these and the physicochemical data. AS

### 138

[Deep-freezing of raspberries: possibilities and limits.]  
Crivelli, G.

*Annali dell'Istituto Sperimentale per la Valorizzazione Tecnologica dei Prodotti Agricoli* 8, 395-398 (1977) [6 ref. It, en]

This review deals with advantages and defects of deep frozen raspberries and quotes results of panel assessment of the Lloyd George, Taylor, Newburg and Southland cv. [see FSTA (1977) 9 6J839] and also of the September cv. SKK

### 139

[Behaviour of quick-frozen vegetables. V. Suitability of varieties of peas and green beans.]  
Senesi, E.; Crivelli, G.; Bertolo, G.

*Annali dell'Istituto Sperimentale per la Valorizzazione Tecnologica dei Prodotti Agricoli* 8, 99-105 (1977) [2 ref. Fr, en, it] [IVTPA, Milan, Italy]

47 var. of (i) peas and 51 var. of (ii) green beans were examined during 1976; samples were blanched, cooled immediately in running water, quick-frozen unpackaged in a forced-draught tunnel at  $-35^{\circ}\text{C}$  for 20 min for (ii) and 10 min for (i), and stored in polyethylene sachets at  $-20^{\circ}\text{C}$  for 6 months; they were then cooked frozen in water with 1% NaCl for 5 min for (i) and 6 min for (ii) and assessed organoleptically by a taste panel. Frostar,

Coronet and Prinsa cv. of (i) and Lit 551, Rofin, Rubicon, Silver and Ulysse cv. of (ii) were judged the most suitable for freezing. Defects leading to rejection were broken seeds and abnormal coloration in (i) and sloughing and collapse in (ii). [See FSTA (1977) 9 3J340 for part IV.] SKK

### 140

**Texture modification of processed apple slices by a postharvest heat treatment.**

Lidster, P. D.; Tung, M. A.; Garland, M. R.; Porritt, S. W. *Journal of Food Science* 44 (4) 998-1000, 1007 (1979) [20 ref. En] [Dep. of Food Sci., Univ. of British Columbia, Vancouver, Canada V6T 1W5]

Exposure of Spartan apples (*Malus pumila* Mill) to  $38^{\circ}\text{C}$  for 6 days immediately after harvest resulted in a significant reduction in softening during 4 months cold storage. The heat treatment significantly depressed titratable acidity but did not affect soluble solids levels. After 6 months cold storage the apples were prepared as thermally processed slices in retort pouches which were stored at  $37^{\circ}\text{C}$  for 16 wk before product quality was evaluated. Both shear force detn. and sensory analysis revealed that the postharvest heat treatment resulted in significantly firmer apple slices. Calcium dipping as a preprocess treatment also significantly increased apple firmness but control apple slices with Ca added were only as firm as heat-treated slices without added Ca. Colour of the processed slices was slightly affected by the heat treatment but the flavour was not. The sensory panelists significantly preferred the  $38^{\circ}\text{C}$  postharvest heat-treated processed apple slices overall. IFT

### 141

**Chemical and sensory qualities of fresh market tomatoes.**

Watada, A. E.; Aulenbach, B. B.

*Journal of Food Science* 44 (4) 1013-1016 (1979) [6 ref. En] [USDA Horticultural Crops Lab., SEA-AR, AMRI, Beltsville, Maryland 20705, USA]

Chemical and sensory attributes of table-ripe tomatoes harvested at different stages of maturity were evaluated. Intensities of sensory attributes were similar in table-ripe tomatoes harvested at the 'mature-green' and 'breaker' stages. Intensities of 'sweetness', 'saltiness' and 'fruity-floral' flavour were higher in tomatoes harvested at the 'table-ripe' stage than at earlier stages of maturity. Desirability of tomatoes was closely associated with the fruity-floral attribute. Variations of sensory attributes were due to volatile and nonvolatile components. The amount of the variation explained by the components generally increased when the areas of the volatile peaks were converted to logarithms for stepwise regression analysis. IFT

### 142

**Commercial feasibility of an in-line steam process for conditioning pecans to improve shelling efficiency and maintain product [nutmeat] quality.**

Forbus, W. R., Jr.; Tyson, B. L.; Ayres, J. L.

*Journal of Food Science* 44 (4) 988-993, 997 (1979)



[13 ref. En][USDA Richard B. Russell Agric. Res. Cent., SEA, Athens, Georgia 30604, USA]

Tests at a commercial plant showed that a new in-line steam process was better than the existing process in conditioning inshell pecans for cracking, as determined on the basis of shelling efficiency, or yield of unbroken nutmeat halves. Steam conditioning was more effective than commercial conditioning in reducing total plate count and yeast and mould count on the product. Peroxide and free fatty acid values of oils, Hunter colour values of nutmeat halves and sensory taste analyses indicated that the quality of the nutmeats conditioned by the 2 methods was essentially the same immediately after conditioning. Commercial test results agreed with results of previous pilot-scale studies. IFT

## 143

**Pea: a highly functional fortifier in wheat flour blends.** [Lecture]

Jeffers, H. C.; Rubenthaler, G. L.; Finney, P. L.; Anderson, P. D.; Bruinsma, B. L.

*Science and Education Administration, United States Department of Agriculture* ARM-W-4, 170-179 (1978) [14 ref. En][W. Wheat Quality Lab., USDA, Pullman, Washington 99164, USA]

The physical dough properties and baking potential of raw and cooked yellow pea flour fortification of bread were investigated. Results, shown graphically and in tables, revealed some differences in physical dough and baking properties: for each 5% increase in pea flour (up to 20%),  $KBrO_3$  requirement rose by 5 p.p.m., and baking absorption increased (by 1.8% and 1.2% for raw and cooked pea flour, resp., vs. 2.2% for soy flour). Mixing time decreased  $\frac{3}{4}$  for all levels. Proof time increased with rising pea and/or soy flour addition (resulting in higher proof heights), loaf vol., crumb grain and texture decreased (though less for pea than for soy flour). Taste panel evaluations showed no significant differences. 20% pea flour fortification contributed as much protein as 9.0% soy flour and as much lysine as 12.8% soy flour. Due to the low levels of antinutritional factors (trypsin inhibitors, haemagglutinins, phytic acid) prior heat processing of pea flour was not necessary. No dough improvers were needed to produce acceptable bread with 15% yellow pea flour fortification. [See FSTA (1979) 11 11M1177.] RM

## 144

**Comparison of chemical and sensory methods of evaluating thermally oxidised groundnut oil.**

Odumosu, O. T.; Sinha, J.; Hudson, B. J. F.

*Journal of the Science of Food and Agriculture* 30 (5) 515-520 (1979) [11 ref. En][Dep. of Food Sci., Univ. of Reading, Reading RG1 5AQ, UK]

7 chemical methods, namely peroxide value (PV), totox value ( $TV = 2PV + AV$ ), anisidine value (AV), conjugable oxidation products (COP), oxodiene value (OV), induction period (IP), iodine value (IV) and a sensory analytical procedure (flavour score, FS) were used in evaluating the oxidation state of groundnut oil heated at 100°C for varying lengths of time up to 20 h. As oxidation progressed, PV, TV, AV, COP and OV increased. IP and IV decreased with oxidation while FS

showed a progressive deterioration on a 7-point scale from bland to very rancid. On the basis of sensitivity to oxidative changes, 5 of the methods (PV, TV, IP, IV and FS) were found to be satisfactory. However, the best correlations with flavour scores were obtained in the case of IP, IV and OV while AV and COP correlated poorly with FS. Three methods (PV, IP and IV) best satisfied the combined criteria of sensitivity to oxidative changes and correlation with flavour. AS

## 145

**[Volatile substances as quality index of cask-stored ewes' milk cheese.]** (In 'Zbornik prednasok z III. celostatneho Sympozia o aromatických látkach v pozivatinách' [see FSTA (1979) 11 11A775]) [Lecture] Palo, V.; Vetermannova, V.; Vetermann, M. pp. 26-34 (1977) [5 ref. Sk][Chem. Tech. Fak., Slovenska Vysoke Skola Tech., Bratislava, Czechoslovakia]

Ewes' milk cheeses from 3 Slovakian Bryndza factories cask-stored at 8-14°C for 7-9 months were examined organoleptically by a panel for taste, aroma and consistency. Total volatile substances obtained by acetonitrile extraction were fractionated by GLC, and a quality index based on computation of 12 peaks on chromatograms in relation to organoleptic assessment was derived. The computation procedure is described in detail. It was concluded that the quality index may be used in objective evaluation of cask-stored cheese based exclusively on GLC analysis without sensory examination. SKK

## 146

**Mechanically separated fish flesh from Australian species - a summary of results of storage trials.**

Bremner, H. A.

*Food Technology in Australia* 30 (10) 393-398, 400-401 (1978) [30 ref. En][CSIRO Tasmanian Food Res. Unit, Hobart, Tasmania 7000 Australia]

Results on separate but similar storage experiments carried out on frozen blocks of mechanically separated (minced) flesh from a var. of Australian fish spp. (tuna, gemfish, perch, salmon, cucumber fish, blue grenadier, silver trevally, tiger flathead, ocean perch, red gurnard, saw shark, nannygai, ling and spiny flathead) are reviewed. In each experiment minced fish was stored at -18°C in the form of frozen blocks  $\leq 1$  yr. Blocks were withdrawn from store at intervals, thawed and divided into 3 portions, 1 portion for analysis and 2 for taste panel evaluation. pH, crude protein, fat, formaldehyde, free fatty acid, extractable malonaldehyde and saline-extractable protein were determined. Taste panel scored the minces, and fish fingers prepared from them, for aroma, off-aroma, flavour, off-flavour, texture (toughness), moisture and acceptability on a 9 point scale. Analytical data and taste panel findings are tabulated for the 14 fish var. Attention is drawn to overall trends and the marked differences in some properties between the spp. VJG

## 147

**Effect of delayed heading on some quality attributes of *Penaeus* shrimp.**

Alvarez, R. J.; Koburger, J. A.



*Journal of Food Protection* 42 (5) 407-409 (1979)  
[23 ref. En] [Food Sci. & Human Nutr. Dep., Univ. of  
Florida, Gainesville, Florida 32611, USA]

To determine the effect of delayed heading on shrimp quality, shrimp were stored on ice with and without heads for 10 days. Some shrimp were delay-headed after 5 days and returned to ice for the remainder of the storage period. Microbiological studies were conducted at 0, 5 and 10 days of storage. Total aerobic plate counts were done using Standard Plate Count agar with an added 0.5% NaCl. Incubation was at 20°C for 5 days. Analyses indicated similar counts on shrimp tails stored with or without heads and those delayed-headed. Counts ranged from  $2.4 \times 10^6$  bacteria/g at 0 day to  $1.6 \times 10^9$  bacteria/g on the 10th day. Identification of the flora present revealed that the same major groups of organisms predominated on shrimp tails subjected to the different storage treatments and the head did not alter development of the usual flora. *Flavobacterium*, *Pseudomonas*, *Planococcus*, *Moraxella* and the *Vibrio/Aeromonas* group were the major genera encountered. A shift in bacterial populations was observed during storage. *Flavobacterium* sp. predominated during the first 5 days of storage; however, after the 5th day *Pseudomonas* spp. predominated. Sensory panel data revealed no differences in acceptability between shrimp tails stored with or without heads and those delay-headed. AS

## 148

**Preliminary taste acceptability tests on Pacific hake and walleye pollock as menu items.** [Booklet]  
Yee, J. G.  
18pp. (1977) [6 ref. En] 300 South Ferry Street, Terminal Island, California 90731, USA; National Marine Fisheries Service, SW Region

A score sheet designed to measure taste acceptability of seafood items prepared from various underutilized species, together with guidelines for food rating, was developed. The score sheet allows 2 products to be rated at one time, and each product is examined for appearance, texture, flavour, and overall eating quality. Fish used in these preliminary acceptability tests were Pacific hake (*Merluccius productus*) and walleye pollock (*Theragra chalcogrammus*). Pollock products tested were a Manhattan-style (tomato base) chowder, fish dip with curry seasoning, fish dip with cream cheese and pimentos, and pollock baked in teriyaki sauce. Hake products tested were hake onion spread, smoke-flavoured hake and peanut spread, hake loaf with mushroom sauce or cheese sauce, and hake in teriyaki sauce. Results of 4 different tests, each using a limited number of products, are described and scores (7-point scale) are given. In general, pollock chowder received the highest scores, and teriyaki hake was the preferred hake product. AL

## 149

**Gross composition, sensory evaluation, and cold storage stability of underutilized deep sea Pacific rattail fish, *Coryphaenoides acrolepis*.**  
Kremsdorf, D. L.; Josephson, R. V. [R. W.]; Spindler, A. A.; Phleger, C. F.

*Journal of Food Science* 44 (4) 1044-1048 (1979)  
[27 ref. En] [School of Family Studies & Consumer Studies, San Diego State Univ., San Diego, California 92182, USA]

Pacific rattail (grenadier) fish, relatively abundant underutilized deep sea fish off the coast of California, were retrieved and analysed for gross composition, sensory attributes, consumer acceptance, and storage stability characteristics. Representative fillet samples analysed contained an average of 14.1% protein, 1% ash, low lipid (0.5%), and relatively high moisture (84.2%). While differing in sensory attributes and slightly in gross composition from commercially frozen Icelandic cod (*Gadus morhua*), a fish with similar taxonomy and demonstrated consumer acceptance, Pacific rattails were 'liked moderately' by sensory judges and compared favourably with cod in both preference and hedonic tests. Their iced cold storage stability over a 20-day period was judged to be excellent. Overall decreased iodine values (i.e., lipid oxidation) and increased hypoxanthine (i.e., nucleotide degradation) content were measured during storage. No evidence of proteolysis was found for up to 15 days of cold storage by sodium dodecyl sulphate (SDS) polyacrylamide gel electrophoresis. However, significant changes in sensory attributes, odour, texture, moisture were not noted until after 15 days storage and acceptance dropped only slightly and not significantly even after 20 days. IFT

## 150

**[Microbial contents of smoked fish.] Zum Keimgehalt von Räucherfischen.**  
Kleickmann, A.; Schellhaas, G.  
*Archiv für Lebensmittelhygiene* 30 (1) 26-29 (1979)  
[9 ref. De, en] [Landes-Veterinäruntersuchungsamt für Rheinland-Pfalz, Blücherstrasse 34, 5400 Koblenz, Federal Republic of Germany]

123 samples of smoked fish collected for official inspection were examined for sensory and microbiological quality. 42 samples had serious sensory defects, 26 samples slight defects. Tabulated results showed that sensory defects were related to total and Enterobacteriaceae counts. Results suggested that aerobic counts  $\geq 10^6$ /g and Enterobacteriaceae  $\geq 10^5$ /g must be considered to be health hazards. These limiting values must take account of product-specific factors. As a result of pH and  $a_w$  (water activity) detn., smoked fish have to be classified as a medium or highly perishable food. AS

## 151

**[Effect of addition of spices on the flavour of chicken.]**  
Polic, M.; Nedeljkovic, L.  
*Tehnologija Mesa* 19 (12) 359-362 (1978) [6 ref. Sh, en]  
[Jugoslovenski Inst. za Tehnologiju Mesa, Belgrade, Yugoslavia]

The effect of the addition of 15 different spices to a mixture of equal parts of ground white and dark poultry meat was tested organoleptically after pasteurization (90 min at 80°C) and sterilization (35 min at 116°C) to determine which spices are compatible or incompatible



with hens meat. The results obtained will serve as a basis for the formulation of specific spice mixtures for various poultry meat products. According to the tests the spices fall into three groups: compatible spices (black pepper, nutmeg, garlic, marjoram, parsley, celery, oregano, curry, and rosemary); neutral spices with no effect on the flavour of poultry meat (red pepper, coriander, caraway and allspice); and unacceptable spices causing an off-taste (thyme and basil). The spices of the neutral group should be further tested in various combinations with those of the compatible group to arrive at improved spice mixtures. STI

## 152

**Sensory properties, proximate analysis and cooking losses of meat loaves extended with chickpea meal or textured soy protein.**

Shaner, K. M.; Baldwin, R. E.

*Journal of Food Science* 44 (4) 1191-1193 (1979) [15 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Missouri, Columbia, Missouri 65211, USA]

Substitution of meat with 30% textured soy protein (TSP) or chickpea meal decreased intensity of beef aroma and flavour of beef loaves, with chickpea substitution giving the most intense bean flavour. Control loaves were the most juicy, and chickpea-substituted loaves were the least. Legume substitution resulted in significant decrease in total cooking losses and losses due to drip, with chickpea meal having a greater effect. There were no differences in mean sensory scores for loaves baked in a loaf pan or on a rack, but cooking losses tended to be greater for loaves baked on a rack. Protein content was reduced significantly by substitution with chickpea meal. IFT

## 153

**Sensory, textural and yield properties of a combination ham extended with isolated soy protein.**

Siegel, D. G.; Tuley, W. B.; Norton, H. W.; Schmidt, G. R.

*Journal of Food Science* 44 (4) 1049-1051 (1979) [24 ref. En] [Dep. of Anim. Sci., Univ. of Illinois, Urbana, Illinois 61801, USA]

Combination hams were prepared by injecting deboned ham muscles with brines containing solubilized isolated soy protein. The muscles were injected to levels of 30%, 45% or 60%, and then subjected to either 0 or 18 h of intermittent massaging. The effects of massaging, isolated soy protein, and the level of injection on binding strengths, cooking yields and taste-panel scores were examined. Massaging and isolated soy protein improved both binding strength and cooking yield. Increasing levels of injection decreased binding strength and cooking yield. Massaging improved uniformity, textural appeal, and overall acceptability, but decreased tenderness and did not affect juiciness and flavour. IFT

## 154

**Flavor: its chemical, behavioral, and commercial aspects.** [Book]

Apt, C. M. (Editor)

xv + 229pp. ISBN 0-89158-223-9 (1978) [many ref. En]

Boulder, Colorado, USA; Westview Press Inc. Price £16.50

Papers presented at the Arthur D. Little, Inc., Flavour Symposium, 1977, review significant current research in flavour technology. Various authors discuss why food tastes the way it does, how its flavours affect us, and the critical role of flavour in the marketplace. Chapters on chemistry describe new analytical techniques for the isolation of flavour compounds. The book is divided into 3 sections: The chemistry of flavor (pp. 9-76); The behavioral aspects of flavor measurement (pp. 79-159); and The commercial world of flavor (pp. 163-222). Chapters included are: Introduction to the chemistry of flavor, by C. M. Apt (pp. 9-11, 6 ref.). The role of analytical chemistry in flavor creation, by C. J. Mussinan (pp. 13-30, 11 ref.). Flavor Characteristics of synthetic cooling compounds, by H. R. Watson (pp. 31-50, 8 ref.). Molecular aspects of sweet taste, by G. A. Crosby, G. E. DuBois & R. E. Wingard, Jr. (pp. 51-66, 12 ref.). Interactive flavor influence of some materials in different foods and beverages, by W. A. Hardwick (pp. 67-76, 12 ref.). Introduction to the behavioral aspects of flavor measurement, by C. Pfaffmann (pp. 79-87, 6 ref.). Flavor and the neural organization of feeding behavior, by R. Norgren (pp. 89-100, 19 ref.). The use of characteristic flavorings in human culinary practice, by P. Rozin (pp. 101-127, 79 ref.). Social psychological considerations in flavor measurement, by D. H. Walsh (pp. 129-147, 26 ref.). Statistical treatment of flavor data, by I. Miller (pp. 149-159). Introduction to the commercial world of flavor, by R. N. Frank (pp. 163-165). Flavor and the bottom line, by J. M. Fox (pp. 167-174). Growth of an industry, by F. W. Schubert (pp. 175-187). Marketing to the consumer, by K. A. Wall (pp. 189-195). Man and food, by J. F. Angeline (pp. 197-206, 4 ref.). World food security: closing the gap between what is and what should be, by D. H. Wood (pp. 207-222, 4 ref.). VJG

## 155

**[Sensory assessment of essential oils of spices.]**

Verfahren zur sensorischen Beurteilung des Geschmacks ätherischer Öle von Gewürzen. Koller, W. D.

*Lebensmittel-Wissenschaft und -Technologie* 12 (2) 123 (1979) [De, en] [Bundesforschungsanstalt für Ernährung, Engesserstrasse 20, D-7500 Karlsruhe, Federal Republic of Germany]

Essential oils because of their high concn. of aroma substances cannot be tasted as such and whipping cream was found to be an excellent diluent. The preparation of the samples is very simple; it involves adding the oil to liquid whipping cream and whipping it subsequently to a firm foam, this resulting in an optimum and stable dispersion of the oil in the rigid product. Best results were obtained when the oil was added at a rate of 0.1% in relation to the cream. A simplified profile analysis is a suitable method for sensory evaluation of spices. FL

## 156

**[Regression analysis for the relation between sensory analysis and analytical data of traditional shochu presented to the 2nd contest.]**



Sugama, S.; Nishiya, T.; Okazaki, N.; Otsuka, K.  
*Report of the Research Institute of Brewing [Jozo Shikenjo Hokoku]* 150, 10-27 (1978) [3 ref. Ja] [Nat. Res. Inst. of Brewing, Kita-ku, Tokyo, Japan]

Various kinds of shochu made from sweet potato (58 samples), rice (33), barley (24), buckwheat (8), white rice-bran (9), sake cake (12), sake (2), black sugar, corn, chestnut, millet, and potato (1 each) and awamori (21) were contested in 1978. Acid flavour, oily smell, defect in distillation, and defect in materials were noted to be causes of inferior quality. Characteristics of awamori, sake cake shochu, and sweet potato shochu were explained using factor analysis by the isoamylalcohol/n-propylalcohol ratio and isoamylalcohol and methanol contents. YN

## 157

### Sensory analysis of bitterness in apple wine.

Roozen, J. P.; Buren, J. P. van  
*Journal of Food Technology* 14 (3) 315-320 (1979) [10 ref. En] [Dep. of Food Sci., Agric. Univ., De Dreijen 12, 6703 BC Wageningen, Netherlands]

A dilution test determining the occurrence of basic tastes in apple wine and hard cider showed sourness, sweetness and bitterness to be present. For selection of assessors a bitterness standard was defined as a taste difference between 2 apple wines. Ranking and paired comparison tests were used for analysis of bitterness levels. Additions to fermentations improving growing conditions for yeast decreased the bitterness of apple wine. AS

## 158

### Will consumers accept new diet beverages sans saccharin?

Moore, K. K.  
*Food Product Development* 12 (5) 68, 72 (1978) [En]

Canadian diet beverages (which have been reformulated without saccharin) were compared with US saccharin sweetened drinks to see whether acceptable products could be produced if US manufacturers were forced to reformulate without saccharin, should the latter be banned by the FDA. An 8-member panel of men and women (4 who normally drink diet soft drinks and 4 who do not) evaluated the beverages: Canadian Diet 7-Up and Diet Pepsi (sweetened with high fructose corn syrup), Sprite Light (sucrose sweetened), and the US saccharin sweetened counterparts Diet 7-Up and Diet Pepsi. Triangle test results indicate that significant taste differences exist between the saccharin sweetened diet beverages and their new, non saccharin-containing formulations. Saccharin products appear to be sweeter than the Canadian beverages. Overall mean scores indicate that saccharin-sweetened Diet 7-Up is preferred over the new formulations, while reformulated Diet Pepsi scored higher than its counterpart. VJG

## 159

### Development of an odour profile to describe apple juice essences.

Dürr, P.  
*Lebensmittel-Wissenschaft und -Technologie* 12 (1)

23-26 (1979) [21 ref. En] [Swiss Fed. Res. Sta. for Fruit Growing, Viticulture & Horticulture, CH-8820 Wädenswil, Switzerland]

The sensory method of flavour profiling is briefly reviewed. A vocabulary to evaluate the odour of commercial apple juice essence has been developed and used for quality control. Collection, screening, use and suitability of 18 terms are described: pungent, grass like, pomace like, solvent like, fruity, floral, etherish, almond like, cooked apple like, sweet, alcoholic, fusel oil like, heavy, rancid, oily, soapy, stuffy and rotten. A panel of 15 assessors has been trained in using the vocabulary by presenting chemicals with particular odour qualities. Results and experiences from practical work are discussed with a view to improvement of the vocabulary. AS

## 160

### Storage of green tea by the use of various packaging.

Fukatsu, S.-I.  
*JARQ (Japan Agricultural Research Quarterly)* 12 (1) 33-38 (1978) [7 ref. En] [Tea Tech. Div., Nat. Res. Inst. of Tea, Japan]

Moisture, N<sub>2</sub> and odour permeability of plastics films suitable for packaging green tea were examined. Pouches with a surface area of 45 cm<sup>2</sup> were made from 14 types of films, 45 g high-grade green tea being placed in each. The sealed pouches were then stored for 1, 2 and 3 months at 25°C and 80% RH. Quality assessment was made using sensory tests and analysis for water and vitamin C contents. (i) A multi-layer film laminated with Al and (ii) a polypropylene film coated densely with PVDC gave best quality results. (iii) Cellophane-polyethylene laminate was least effective, the quality deteriorating at about 1 month, and some samples becoming undrinkable after 3 months. Samples assessed as of unchanged quality had moisture contents of <5.5% (5% after 1 month) and rates of residual vitamin C >70%. Samples assessed as of deteriorated quality showed moisture contents >6.0% and residual vitamin C of <70%. Pouches were prepared as for moisture permeability studies but with N<sub>2</sub> gas instead of air. Almost no gas permeability was observed with (i), followed by multi-layer vinylon film and (ii). All the films except (i) are unsuitable for long term storage because of their moisture permeability. Tests on odour permeability of the films using butyl acetate showed no transfer of odour with (i) and almost no transfer with (ii). All members recognized odour not specific to tea with (iii). VJG

## 161

### Quality evaluation of apples: development of descriptive quality profile for sensory quality. (In 'Proceedings of the First Indian Convention of Food Scientists and Technologists' [see FSTA (1979) 11 12A871]) [Lecture]

Dhanaraj, S.; Ananthakrishna, S. M.; Govindarajan, V. S.  
pp. 24-25, No. 211 (1979) [En] [Cent. Food Tech. Res. Inst., Mysore, India]

Using Red Delicious apples grown in India and trained panelists (selected on the basis of their ability to discriminate between samples and to judge replicate samples the same), a 7-point descriptive quality profile



for 4 important quality attributes (texture, juiciness, aroma, taste) was developed. The profile is of an inverted V shape for each attribute, with optimally ripe quality descriptions at the apex, 3 distinct levels from unripe to optimally ripe in ascending order and 3 distinct levels from optimally ripe to over-ripe in descending order. The profile was used to evaluate apples harvested at different maturities, transported by road or air and held in a cold store for 4 wk. A negative correlation was found between the results of subjective and objective assessments of quality. JA

## 162

**A non-destructive test for the maturity of French beans (*Phaseolus vulgaris*).** (In 'Proceedings of the First Indian Convention of Food Scientists and Technologists' [see FSTA (1979) 11 12A871]) [Lecture] Ramaswamy, H. S.; Ranganna, S.; Govindarajan, V. S. p. 54-55, No. 5.6 (1979) [En] [Cent. Food Tech. Res. Inst., Mysore, India]

French beans (var. Burpee Stringless), harvested 8-20 days after withering of the flowers, were analysed for density, TS, alcohol-insoluble solids (AIS), crude fibre, sugars, acidity, ascorbic acid and peroxidase activity; further studies examined the wt./length (W/L) ratio, texture (shear force required to cut the beans either vertically or horizontally), perimeter of cross-section and also sensory characteristics (colour, flavour, appearance, fibrousness) before and after cooking. Sensory data indicated that optimum maturity occurs after 15-17 days. Length, wt., perimeter of cross-section, vertical shear force, TS, AIS, crude fibre and W/L ratio increased as the beans matured. The W/L ratio increased linearly and would therefore provide a simple non-destructive method for assessing maturity, beans being very tender up to a ratio of 0.35 g/cm, tender at  $\leq 0.46$  g/cm and mature at  $> 0.56$  g/cm. JA

## 163

**Enrichment of ingredients for fabricated foods by fermentation and germination of corn and sorghum.** Wang, Y.-Y. D.

*Dissertation Abstracts International*, B 38 (10) 4717-4718: Order no. 78-03782, 248pp. (1978) [En] [Univ. of Missouri, Columbia, Missouri 65201, USA]

Corn and sorghum were treated with 0.5%  $H_2SO_4$  to hydrolyse starch into fermentable sugars. *Candida tropicalis* ATCC 1369 and *Saccharomyces cerevisiae* grew well in the acid hydrolysates. Rat feeding studies indicated a complementary effect between corn and yeast, or corn residue and yeast. Nucleic acid content reduction was effected in *C. tropicalis* by heating in 0.33N HCl in a boiling water bath for 30 min. This resulted in a 26% reduction in the yeast nucleic acid content, whereas the other process (pH 2, heated at 90°C for 30 min) tested was unsuccessful. The amino acid profiles indicated reduced lysine content in the acid-hydrolyzed-corn residue. *C. tropicalis* had a low methionine but a high lysine content. The relative nutritive value (RNV) of the products was determined with *Tetrahymena pyriformis* W. Fermentation of corn malt-hydrolysed corn slurries with yeasts resulted in improved RNV in the fermented products. Frequent washing of the seeds with water was found to be the

most practical method for prevention of mould growth on germinating seeds. Effects of germinating time and temp. on the nutritional qualities of the corn and sorghum were studied. Taste panels fed corn muffin and tortillas prepared with germinated corn flour significantly preferred the non-substituted controls. However, the substituted samples of the test products had improved RNV. HBr

## 164

**Changes in lipid composition of irradiated wheat and their cumulative effects on bread quality.** (In 'Proceedings of the First Indian Convention of Food Scientists and Technologists' [see FSTA (1979) 11 12A871]) [Lecture]

Rao, V. S.; Vakil, U. K.; Sreenivasan, A. pp. 7-8, No. 1.8 (1979) [En] [Biochem. & Food Tech. Div., Bhabha Atomic Res. Cent., Trombay, Bombay, India]

In connection with development of off-flavours in bread prepared from irradiated (1 Mrad) wheat, studies were made of effects of irradiation ( $\leq 1$  Mrad) on wheat lipids and purothionines, formation of volatile flavour compounds in bread and sensory quality of bread. Irradiation had no effect on total lipid content of the wheat; however, at 1 Mrad, there was a marked increase in free lipids and a concomitant decrease in bound lipids. Studies of purothionines indicated that irradiation resulted in degradation into low mol. wt. proteins or peptides. A taste panel detected no off-flavours in bread prepared from wheat irradiated with 0.02 Mrad but at higher doses an unpleasant flavour was detected. A direct relationship was found between taste panel data and content of carbonyl compounds in the bread; as the carbonyl content increased, bread aroma and taste became less desirable. JA

## 165

**[Standardization of a baking test for waffles.]**

Standardisierung eines Backversuches für Flachwaffeln. Seibel, W.; Menger, A.; Ludewig, H.-G.; Seiler, K.; Bretschneider, F.

*Getreide, Mehl und Brot* 32 (7) 188-193 (1978) [21 ref. De]

A standard recipe and method for waffle production is proposed for the purpose of studying the effect of the different ingredients on quality. The results are given of some studies carried out using the standard method. The recipe consisted of white flour type 1050 or 550 (100 parts), groundnut oil (4 parts), sugar (2.5 parts), salt (0.2 part), sodium hydrogen carbonate (0.6 part), and water to give 35% dry substance. The waffle batter was prepared with a mixer for 3 min and baked with a hand waffle iron at 185°C for 3 min. Rheological properties were studied with a continuous-flow viscometer. Quality of both waffle batter, and baked product was tested by objective and sensory techniques. The method was used to assess the effects of varying the amount of water used, the effect of the type and quantity of raising agent, the influence of flour quality, and the effects of various amounts of soy flour, whole eggs and emulsifiers. MJD



## 166

**Effect of compression ratio on the mechanical properties of cheese.**

Imoto, E. M.; Lee, C.-H.; Rha, C. K.

*Journal of Food Science* 44 (2) 343-345 (1979) [4 ref. En] [Dep. of Nutr. & Food Sci., Massachusetts Inst. of Tech., Cambridge, Massachusetts 02139, USA]

The effect of compression ratio on the following mechanical properties of cheeses [cream cheese, Mozzarella, Muenster, American cheese, mild Cheddar, sharp Cheddar and processed American cheese] was studied: compression force, work ratio, adhesive force, recovered height, and compression ratio at the inflection point. The mechanical properties changed with compression ratio in a unique pattern for each type of cheese; changes in work ratio and recovered height produced the most distinctive patterns. The mechanical responses of processed American cheese to changes on the compression ratio clearly differed from those of natural ripened cheeses. The correlations between sensory evaluations of hardness, chewiness, springiness and adhesiveness, and the mechanical properties measured by instrument changed with the compression ratio used for the instrumental detn. Therefore, the optimum compression ratio to be used for instrumental detn. of mechanical properties must be evaluated for each property with the fitness test correlating instrumental and sensory evaluations. IFT

## 167

**The effect of feed containing Cycostat on the taste of broiler chickens.**

Klinger, I.; Basker, D.

*Refuah Veterinarith* 34 (1) 21-24 (1977) [9 ref. En] [Kimron Vet. Inst., Bet-Dagan, Israel]

Chickens were fed a diet containing 33 p.p.m. of the anticoccidial agent Cycostat (1,3-bis-p-chlorobenzylideneamino-guanidine hydrochloride) from birth until slaughter; control chickens received the same diet without Cycostat. In trial I, legs and breast meat obtained from 7-wk old chickens immediately after slaughter were cooked for 20 min at 15 lb/in<sup>2</sup> with water and salt. In trial II, chickens slaughtered at 9 wk and stored frozen for 3 wk were used; the quartered carcasses were lightly dusted with a mild spice mixture and roasted for 45 min at 200°C. Trial III, performed at the same time as trial II, involved preparation of a consomme from male chickens by boiling for 60 min in 2 l. water containing salt and seasoning. Samples from all 3 trials were organoleptically evaluated by the triangle method. Comparison of Cycostat-treated and control chickens indicated a significant difference only in breast meat flavour; no difference was found in the flavour of leg meat. The taste panels did not find the flavour of treated chicken objectionable and in one case treated chicken was marginally preferred to untreated chicken. JA

## 168

**Sensory and physical measurements of dry fermented salami prepared with mechanically processed beef product and structured soy protein fiber.**

Berry, B. W.; Cross, H. R.; Joseph, A. L.; Wagner, S. B.; Maga, J. A.

*Journal of Food Science* 44 (2) 465-468, 474 (1979) [17 ref. En] [USDA-SEA-AR, Meat Sci. Lab., Beltsville Agric. Res. Cent., Beltsville, Maryland 20705, USA]

Dry fermented salami was prepared from formulations in which 0, 15 and 30% levels of both mechanically processed beef product (MPBP) and structured soy protein fibre (SSPF) were incorporated. A 10-member trained sensory panel for flavour found that the frequency of undesirable flavours was highest for salami with 15% SSPF-0% MPBP and lowest for 0% SSPF-15%MPBP and 0% SSPF-30% MPBP. A second 10-member trained panel found that the salami with 30% SSPF-0% MPBP was lightest in colour, while a 116-member untrained panel found this formulation was undesirable in flavour, tenderness, and overall desirability. Instron and Hunter Colour Difference measurements reflected a toughening and lightening of colour, respectively, for the 30% SSPF-0% MPBP salami in contrast to those treatments made with MPBP. Data from objective measurements (Instron and Hunter Color Difference Meter) were combined for all treatments and showed that salami increased in firmness and darkened with drying time. Both the trained and untrained sensory panels rated salami manufactured with 15 or 30% MPBP as generally comparable to the control salami. IFT

## 169

**[Test methods for canned semi-manufactured products and fruit and vegetable products.]**

Czechoslovakia, Urad pro Normalizaci a Mereni  
*Czechoslovak Standard CSN 56 0246, Amendment e*, 4pp. (1978) [Cs]

Various changes are introduced into the original standard, first published in 1964, which covers sensory testing and 33 physical and chemical tests. HBr

## 170

**Pesticides: organoleptic evaluation of the taste of pesticide-treated grain.**

South Africa, South African Bureau of Standards  
*South African Standard SABS Method 957*, 9pp. (1978) [En]

A method is given to determine repugnant odours and tastes caused by grain protectants at permissible residue tolerances before grain protectants can be registered under the Fertilizers, Farm Seeds, Seeds and Remedies Act. The standard covers apparatus, test material, test panel, procedure, summary of test results, and statistical analysis. AL





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## INTRODUCTION

Food Annotated Bibliographies (FABs) are collections of abstracts on specific topics in food science and technology. The topics are chosen by the staff of the International Food Information Service as being of particular interest or importance. The topics normally interest individual workers, who may not require the full information provided in Food Science and Technology Abstracts, from which the abstracts for FABs are taken. The size and the cost of the FABs are controlled as much as possible with the interests of individual workers in mind.

Titles of the FABs now available are given on the back cover of this booklet. For up-to-date lists of FABs or suggestions for new topics please write to the address on the back cover. New subjects are searched for at least the five most recent volumes of Food Science and Technology Abstracts. Thereafter each FAB is updated monthly. Copies of each month's abstracts on any topic may be obtained as indicated on the back cover of this publication. At the end of each volume of up-dating, the abstracts are merged and made available as a separate supplement to the original FAB.

Some of the larger FABs have been divided into sections to facilitate use. FAB 47 also has a subject and author index provided.

Copies of all original articles referred to in the abstracts may be bought (or occasionally borrowed) from the International Food Information Service. A form for ordering these is provided at the end of this FAB.

Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES  
EDITOR





## 1

**Sensory testing of foods – use and abuse.**

Anderson, A. M.

*Food Technology in New Zealand* 12 (10) 31–32, 35, 37–40 (1977) [6 ref. En] [Food Tech. Dep., Massey Univ., Palmerston North, New Zealand]

The employment of sensory testing procedures for foods may be performed by an analytical panel, usually small, trained and of fixed composition or by a consumer panel, usually considerably larger, and chosen at random with no special skills. The special considerations of which account must be taken in designing sensory tests and interpreting results are those pertaining to be physiological and psychological condition of the panel, the effects of presentation of the test material, and the effects of the environment in which the tasting takes place. Results of sensory testing may be recorded in various ways, e.g. on a nominal scale, where samples fall into groups on the basis of their characteristics, on an ordinal scale, where samples are given a rank order with respect to a characteristic, on an interval scale, where a measure of the magnitude of difference between samples may be indicated, or on a ratio scale, where relative strengths of a characteristic may be defined. The type of scale employed has a critical bearing on the validity of statistical evaluation of results, and the inherent assumptions of statistical procedures should be carefully borne in mind. JRR

## 2

[Sensory testing of coffee.] Kaffee sensorisch geprüft. Ernst, U.

*Tara* 31 (356) 205–209; (357) 269–271 (1979) [3 ref. De]

A series of tests was carried out at the St. Gallen Research Station (Switzerland) for Jacobs Management & Consulting AG to determine the effect of packaging coffee in gas-permeable and gas-tight packages for varying storage times, on the sensory quality of the products. Coffee beans were packaged in conventional paper brick-shaped packs, while ground coffee (from the same roasting) was packaged in an Al/plastics laminate under vacuum, an Al/plastics pouch with N<sub>2</sub> flushing, or in a metal can with N<sub>2</sub> flushing. Storage was at 20°C/65% RH and at 40°C (accelerated ageing test). The test panel were ordinary members of the public, predominantly women. A detailed description of the panel test procedure is given. Results, given in tabular and graph form, showed that at 20°C (room temp.) the mean shelf life was 29 days for the beans (gas-permeable pack) and 27–28 wk for the ground coffee (gas-tight packs). At 40°C, the coffee aged about 3–4 × quicker than at 20°C, i.e. 100 days at 40°C corresponded to 300–400 days at 20°C (ground coffee samples tested). HBr

## 3

[Mineral water in a reducing-diet test.] Mineralwasser in einem Reduktionskosttest.

Wirths, W.

*Mineralbrunnen* 29 (3) 56, 58 (1979) [De]

21 overweight (≥ 20%) women and 4 men on a reducing diet (960 kcal daily/person) for 21 days were offered daily 1400 ml 'X' mineral water or 'X' mineral-

spring water (low in CO<sub>2</sub>) in addition to 750 ml daily of other liquids. In taste evaluation on the 9-point 'Karlsruhe' scale, the 2 types of water received from men mean scores of 7.15 and 6.11 resp. and from women corresponding scores of 6.94 and 6.97. Daily consumptions were 680 and 680 ml by men, and 660 and 660 ml by women. Detailed breakdowns of findings are presented. SKK

## 4

[Introduction to wine tasting in the Aude Departement.]

Durand, R.

*Vignes et Vins* No. 266, 65–72 (1978) [Fr] [Inst. Tech. de la Vigne et du Vin, 3 Rue de Rigny, 75008 Paris, France]

The Technical Institute for Wine in Narbonne has introduced courses in wine tasting, primarily for growers in the Aude Department. Initial ½-day sessions give a basic introduction to wine tasting and the special terms used, while further 1-day sessions cover practical tasting procedures. Growers acquire greater knowledge of wine differentiation by appearance, aroma and taste, with ability to deal with trade buyers and secure better prices for their products. Classes are also held for students at the Hotel Training School, Toulouse; these cover wine selection for various food dishes and improve poor presentation of wine in restaurants by young waiters. They are also of interest to holiday visitors, while development of a precise tasting vocabulary is valuable to official commissions. Organization of tasting panels at different levels is described. Initiation comprises development of levels of taste perception, using conventional simple systems based on a hedonic scale followed by award of numerical points in the 3 major areas of appearance, aroma and taste. With growing expertise much more detailed systems of differentiation and points grading (including defects) in each area are introduced. Record forms used at each of 5 stages are reproduced. ELC

## 5

[Organoleptic evaluation of bakery products' quality.] Marshalkin, G. A.; Vas'kina, V. A.

*Khlebopekarnaya i Konditerskaya Promyshlennost'* No. 3, 22–23 (1979) [Ru] [Moskovskii Ordena Trudovogo Krasnogo Znameni Tekh. Inst. Pishchevoi Promyshlennosti, Moscow, USSR]

A questionnaire was circulated among 100 specialists in flour confectionery and a system of 9 quality factors was constructed; the wt. of individual factors were as follows: taste (30%); aroma (14%), shape (12%), surface (10%); resilience (10%); colour (9%); appearance of break (8%); and thickness (1%); thickness is important for packaging operations. The enquiry needs to be made more precise by posing more definite questions, and requires a final assessment of answers. STI

## 6

Organoleptic acceptance of fresh carabaos milk.

Le Trong Trung; Gonzales, R. R.

*Philippine Journal of Nutrition* 31 (1) 36–40 (1978) [2 ref. En] [Univ. of the Philippines, College, Laguna,



Philippines]

Carabaos' milk is said to be richer in nutrients than that of cows or buffaloes, but little information has been published on its consumer acceptability. Milk from cows and carabaos (*Bubalus bubalis*) was analysed for TS and fat contents, and also presented to an experienced 10-member panel for sensory evaluation in terms of flavour attributes, richness (fat content), appearance and overall acceptability. Fat contents were 3.95 and 8.0%, lactose 5.29 and 4.46%, and TS 12.03 and 18.83% for cows' and carabaos' milk resp. in each case. The higher nutrient level means that carabaos' milk is cheaper than cows' milk on a per g fat or TS basis, despite its higher cost/unit vol. Sensory tests showed a significant ( $P < 0.05$ ) difference between the milks in scoring for richness, sweetness and TS (appearance), with carabaos' milk scoring higher in paired difference tests. There were no significant differences in overall preference or acceptability, though it is felt that standardization of carabaos' milk to a slightly lower fat content, and homogenization to remove unpleasantly large fat particles would improve carabaos' milk acceptability. JRR

## 7

**Organoleptic acceptance of fresh carabaos milk.**  
Le Trong Trung; Gonzales, R. R.

*Philippine Journal of Veterinary and Animal Sciences* 2 (2) 63-68 (1976) [2 ref. En] [Univ. of the Philippines, College, Laguna, Philippines]  
See preceding abstr.

## 8

**A method for the objective assessment of cheese flavour.**

Robinson, R. K.

*Milk Industry* 81 (6) 34-35, 37 (1979) [8 ref. En] [Dep. of Food Sci., Univ. of Reading, Reading Berks, UK]

In the proposed scheme, cheeses are graded by a panel of 10 tasters, each of 15 characteristics (5 each associated with 'milk', 'mature' and 'off' flavours) being scored between 0 (lacking) and 5 (strong). When 2 panels each evaluated one 'mild' and one 'mature' Cheddar cheese obtained from a local supplier, overall scores they assigned to the cheeses were broadly similar. Results indicate the possibility of operating a grading scheme based on assessments by a panel of untrained personnel where no professional grader is available. CDP

## 9

**[Study of organoleptic characteristics of frozen beef.]**  
Rantsios, A. T.; Antikatzides, T. G.; Tassiopoulos, A.; Sapountsakis, G.

*Ellenike Kteniatrike* 21 (3) 100-108 (1978) [11 ref. Gr, en] [Kentrou Biol. Ereunon Stratou, Mesogeion 140, Athens, Greece]

50 samples of frozen beef *Longissimus dorsi* muscle (from the level of the 10th rib) were evaluated by a 10-member taste panel. The appearance, aroma, tenderness, juiciness, fatness and overall acceptability were evaluated subjectively, mainly using a 5-point

scale; tenderness and juiciness were also determined objectively. Tables of results are given, including correlations between pairs of the parameters studied. The results show that objective and subjective evaluations are not necessarily equivalent. For expression and evaluation of general acceptability, a 3-point scale is best. Tenderness was the main factor influencing overall acceptability. Taste panellists had difficulty in differentiating between fatness and juiciness. Statistically significant correlations were observed between tenderness and juiciness, and between aroma and appearance. [From En summ.] AJDW

## 10

**Rotatable designs in product development.**  
Mullen, K.; Ennis, D. M.

*Food Technology* 33 (7) 74-75, 78-80 (1979) [5 ref. En] [Dep. of Mathematics & Statistics, Univ. of Guelph, Guelph, Ontario N1G 2W1, Canada]

Use of rotatable response surface design in development of a new food product is explained. Use of the techniques enables detn. of optimal levels of many input variables using the min. number of experimental formulations. An example is given for a 2-variable case, where the effect of sucrose and citric acid levels on sensory response is studied. 13 product formulations are required, and the form of the regression equation associated with the response surface obtained from the 13 formulations is given. Level combinations for 2-5 variable problems are given. DIH

## 11

**[Measurement of the reproducibility of the performance of taste panellists using complete/incomplete composite block designs.]**  
Shirose, I.

*Boletim do Instituto de Tecnologia de Alimentos, Brazil* No. 58, 1-17 (1978) [2 ref. Pt, en] [Inst. de Tecnologia de Alimentos, Campinas, Sao Paulo, Brazil]

## 12

**[The Kolmogorov-Smirnov goodness of fit test for discrete data, and its application in organoleptic evaluation of foods.]**

Shirose, I.; Carvalho, R. L.

*Coletanea do Instituto de Tecnologia de Alimentos* No. 9, 105-123 (1978) [6 ref. Pt, en] [Inst. de Tecnologia de Alimentos, Campinas, Sao Paulo, Brazil]

## 13

**Note: individual differences in taste adaptation.**  
DuBose, C. N.; Meiselman, H. L.

*Chemical Senses and Flavour* 4 (3) 177-181 (1979) [11 ref. En] [Food Sci. Lab., US Army Natick Res. & Development Command, Natick, Massachusetts 01760, USA]

Subjects who had previously participated in a taste adaptation study [DuBose et al. *Perception and Psychophysics* (1977) 21 (2) 183-186] were retested 1 yr later using the same stimuli (0.1M and 0.36M sucrose and NaCl) and experimental conditions (3-min continuous



flow over anterior dorsal tongue surface). Results indicated that individual differences in the reported degree of adaptation were maintained over the long intersession interval. Salivary Na levels and salt recognition thresholds could not account for the persisting individual differences in adaptation to NaCl. Direct examination of subjects' tongue movements is suggested. AS

## 14

[Application of surface-response methodology in determination of the optimum levels of sugar and NaCl in roasted soybean cake.]

Shiroye, I.; Carvalho, R.; Ferreira, V. L. P.; Carvalho, R. L.

*Coletanea do Instituto de Tecnologia de Alimentos* No. 9, 239-256 (1978) [5 ref. Pt, en] [Inst. de Tecnologia de Alimentos, Campinas, Sao Paulo, Brazil]

A central composite rotatable design based on surface-response methodology was applied to the determination of the best combination of sugar and salt for obtaining a max. panel score in roasted soybean cake. The results indicated that the ideal combination consisted of 84.90% sugar and 0.48% salt. AS

## 15

The storage of pelleted powders made from Wye Northdown hops.

Gill, R.; Laws, D. R. J.

*Journal of the Institute of Brewing* 85 (4) 228-230 (1979) [16 ref. En] [Brewing Res. Foundation, Nutfield, Redhill, Surrey, UK]

Pelleted hop powder from seeded Wye Northdown hops of the 1976 crop showed small losses in lead conductance value (LCV) when stored in commercial packs for approx. 12 months after processing. The losses for hops pellets stored at ambient temp. were slightly more rapid than for those stored at 0-4°C. Losses in LCV of pellets during storage in the cold or at ambient temp. were substantially less than those of seeded Wye Northdown cone hops stored in pockets under comparable conditions. The hop pellets showed no significant loss in oil content or bittering potential over the storage period. Taste panels were unable to detect differences in flavour when comparisons were made of beers bittered with pellets stored in the cold and at ambient temp. AS

## 16

[Evaluation of edible quality of commercial satsuma mandarin (*Citrus unshiu* Marc.). Statistical analysis of organoleptic evaluation and sampling for the grading.]

Iino, K.; Osodo, K.

*Journal of the Japanese Society for Horticultural Science* 46 (4) 548-554 (1978) [3 ref. Ja, en] [Nat. Food Res. Inst., Kotoku, Tokyo, Japan]

Statistical analysis was carried out to clarify the relationship of palatability with refractive index and pH value, and to investigate sampling for grading inspection. A multiple regression equation consisting of 6 terms was found reasonable for palatability. The

accuracy of the equation was good even when the organoleptic evaluations was carried out with a different panel and using mandarins from a different crop year. The palatability pattern varied with season. Sweetness was preferred in season, but the range of optimal pH to refractive index of the normal rather than early ripening var. was narrow. Sourness was preferred for stored fruit. The mean value of refractive index and pH of 10 samples selected at random was not so different from the population mean. Therefore, 10 samples seemed sufficient for grading inspection. One measurement of the combined juice of 10 samples was appropriate for inspection. [From En summ.] VJG

## 17

Comparison of farmers' market and supermarket produce: tomatoes and bell peppers.

Sommer, R.; Knight, H.; Sommer, B. A.

*Journal of Food Science* 44 (5) 1474-1477, 1482 (1979) [13 ref. En] [Cent. for Consumer Res., Univ. of California, Davis, California 95616, USA]

Undergraduate students made flavour and appearance ratings of tomatoes and bell peppers purchased from certified farmers' market suppliers and from supermarkets in the same cities. Tomatoes from the farmers' markets were less expensive, those from the supermarkets were more attractive, and there was no difference in flavour preference in double-blind taste trials. Bell peppers from a certified farmers' market were preferred in double-blind flavour trials over bell peppers from supermarkets. IFT

## 18

Organoleptic examination of pears from trees infused with oxytetracycline to remit symptoms of pear decline.

Hankin, L.; Lacy, G. H.; McIntyre, J. L.

*Journal of Food Protection* 42 (9) 732-734 (1979) [12 ref. En] [Dep. of Biochem., Connecticut Agric. Exp. Sta., Box 1106, New Haven, Connecticut 06504, USA]

Pear trees showing symptoms of pear decline were infused with 0.1-2.0 g oxytetracycline/tree post harvest, and the following year's pear harvest was compared by a taste panel with fruit from untreated trees showing pear decline. Fruit was tasted in 4 sessions, i.e. as sauce or cubes from 2 orchards. In all cases fruit from treated trees was distinguished from that from untreated trees ( $P \leq 0.01$ ); in 3 of 4 sessions fruit from treated trees was preferred to untreated and in 1 session cubes of fruit from untreated trees were preferred to treated. This single case may have reflected texture differences as pears from treated trees were not as ripe as untreated ones in 1 orchard. DIH

## 19

Nutritional and sensory evaluation of bread made from fermented wheat meal and corn chips made from fermented corn meal.

Hamad, A. M.; Fields, M. L.

*Journal of Food Science* 44 (5) 1514-1516 (1979) [14 ref. En] [Dep. of Food Sci. & Nutr., Univ. of Missouri, Columbia, Missouri 65211, USA]



Fermented wheat meal was significantly higher ( $P < 0.01$ ) in relative nutritive value (% RNV), lysine, isoleucine and riboflavin than nonfermented wheat meal. Even though there was a decline in % RNV, lysine and isoleucine in bread made from the fermented wheat meal, the % RNV, lysine and isoleucine contents were significantly higher in bread with fermented meal than in the control bread. Riboflavin content remained essentially the same in the bread made from fermented wheat meal as in the fermented meal. The loaf vol. of bread was less than the control when fermented wheat meal was used. The same trend that was observed in the fermented and nonfermented wheat meal and bread occurred in the fermented and nonfermented corn meal and corn chips. The bread and corn chips were scored acceptable by consumer taste panel. IFT

## 20.

### Composite flour bread in Nigeria.

Nout, M. J. R.; Nout-van der Hooft, C. F. S.  
*Voeding* 40 (10) 363-366 (1979) [6 ref. En] [Nigerian Inst. of Food Sci. & Tech., Lagos, Nigeria]

Using simple technology, various types of composite flour bread were prepared, each having the same protein content as the control (100% wheat). Composite flours were of the 'diluted wheat' type, containing 70% wheat flours. Using a selected panel of 35 Nigerian tasters, organoleptic assessment was carried out. Partially defatted groundnut flour was preferred as a protein rich flour, while the composite flour breads containing cassava starch, maize flour, or millet flour received scores which did not differ significantly from those of 100% wheat bread. Yam flour, rice flour, sorghum (guinea corn) flour, or cassava flour in composite flour breads received significantly lower scores than the first mentioned group. AS

## 21

### [Cheese flavour evaluation. I. Sensory profile method and its application to different types of cheese.]

Beiträge zur Bewertung von Käsearoma. I. Erarbeitung einer sensorischen Profilmethode und Anwendung auf verschiedene Käsesorten.

Rothe, M.; Engst, W.; Voigt, I.

*Nahrung* 22 (8) 695-709 (1978) [12 ref. De, en, ru] [Zentralinst. für Ernährung, Potsdam-Rehbrücke, German Democratic Republic]

For the evaluation of varieties of cheeses, a sensory profile test was established and tested by a panel whose members had received several months of training. 14 separate categories of quality as well as total quality and possible off-flavours were evaluated on a 6 point scale. 33 concepts were accorded to the separate categories. All were reproducible with a s.d. of  $< \pm 1$  point. Results for 11 cheese varieties including Edam, Gouda, Emmentaler, Cheddar, Limburg, Blue, Brie and Camembert were presented, giving a visual impression of the differences in quality of the individual types. IN

## 22

### Beer flavor terminology.

Meilgaard, M. C.; Dalglish, C. E.; Clapperton, J. F.  
*Brygmesteren* 35 (10) 249-260 (1979) [9 ref. En] [Stroh Brewery Co., Detroit, Michigan 48226, USA]  
See FSTA (1979) 11 9H1359.

## 23

### [Effects of starter cultures on the flavour of raw dry sausages.]

Scharner, E.; Hofmann, H. P.  
*Husipar* 28 (2) 83-85 (1979) [Hu, en, de, ru] [Inst. für Fleischwirtschaft der DDR, Magdeburg, German Democratic Republic]

Comparative studies were conducted to test whether use of starter cultures adversely influences the organoleptic properties of raw dry sausages. A trained 9-person panel was used. 13 batches of sausages made with and 11 batches of sausages made without starter culture were studied. Tables of results are given. The results show that the taste penellists were unable to differentiate sausages made with and without starter cultures on the basis of their organoleptic properties. AJDW

## 24

### Sensory analysis. Vocabulary. III.

International Organization for Standardization  
*International Standard ISO 5492/III-1979*, 4pp. (1979) [En, Fr]

A further 18 terms and their definitions are listed. [See FSTA (1978) 10 10U1017 for part II.] AL

## 25

### Utilizing sensory evaluation to determine product shelf life. [Lecture]

Dethmers, A. E.

*Food Technology* 33 (9) 40-42 (1979) [13 ref. En] [Sensory Evaluation Div., Swift & Co., Res. & Development Cent., 1919 Swift Drive, Oak Brook, Illinois 60521, USA]

Sensory evaluation of product stability is used to determine shelf-life of existing products; effects on shelf-life of changes in ingredients, processing or packaging; and shelf-life of new products. Factors important for the design of the sensory experiment are described; these include the product composition, treatment variables, storage conditions, anticipated rate of deterioration and anticipated sensory change. Choice of test method is discussed, and parameters used to define the shelf-life from sensory data obtained are considered. The various systems of open-dating currently used in the USA are briefly discussed. [See preceding 2 abstr.] DIH

## 26

### The taste of creatine and creatinine.

Lawless, H.

*Chemical Senses and Flavour* 4 (3) 249-258 (1979)



[14 ref. En] [Food Sci. Lab., US Army Natick Res. & Development Command, Natick, Massachusetts 01760, USA]

4 experiments investigated the possibility of a taster-nontaster dimorphism for creatine and creatinine, and whether perception of these substances was related to sensitivity to phenylthiocarbamide (PTC). Threshold measurements, suprathreshold scaling of perceived intensity, a cross-adaptation experiment and a category scaling task produced consistent results. No relation to PTC was observed. In contrast to previous reports, no evidence of a taster-nontaster effect for creatine or creatinine was found. Creatine was a notably ineffective taste stimulus for all subjects tested. AS

## 27

**Balanced incomplete block designs with reference sample in each block.**

Williams, E. R.; Jones, P. N.

*Journal of Food Science* 44 (6) 1790-1791 (1979) [En] [CSIRO Div. of Mathematics & Statistics, PO Box 1965, Canberra City, ACT 2601, Australia]

Intrablock analysis of balanced incomplete block designs with a reference sample in each block was discussed by Gacula [with reference to sensory scores, see FSTA (1979) 11 3A213]. This note illustrates the importance of obtaining treatment estimates with recovery of interblock information, particularly when blocking has proved ineffective and present several formulas of Gacula in a more natural form. IFT

## 28

**A metric for the breadth of tuning of gustatory neurons.**

Smith, D. V.; Travers, J. B.

*Chemical Senses and Flavour* 4 (3) 215-229 (1979) [42 ref. En] [Dep. of Psychology, Univ. of Wyoming, Laramie, Wyoming 82071, USA]

The breadth of the responsiveness of gustatory neurons to the 4 basic taste stimuli (sucrose, NaCl, HCl and quinine hydrochloride), important to current theories of gustatory quality coding, is discussed. The mathematical expression of entropy was used as a measure of breadth of tuning of these neurons, and was found to vary from 0.0 for a unit that responded exclusively to 1 stimulus (i.e. narrowly tuned) to 1.0 for a cell that responded equivalently to all 4 of the basic compounds (i.e. broadly tuned). Subtle variations in the neural response profile of a cell, such as those produced by changes in stimulus concn., are reflected in this measure. It is concluded that the entropy equation can be meaningfully applied to the problems of gustatory quality coding. SP

## 29

**The microencapsulation of odorants as a method of stimulus control and delivery in studies of odor quality perception,**

Davis, R. G.

*Chemical Senses and Flavour* 4 (3) 191-206 (1979) [7 ref. En] [Veterans Administration Med. Cent., Lexington, Kentucky, USA]

The feasibility of the microencapsulated odorant as a stimulus procedure in multidimensional scaling (MDS) analysed similarity judgments was examined. Also, the effects of repeated testing, both within and between test sessions was studied. Special attention was given to asymmetry of similarity perception. The new method of odour delivery proved to be excellent, and the MDS model produced was as expected. Systematic trends to judge pairs as increasingly similar over repeated judging, both within and between sessions, was observed. There were instances of asymmetry of similarity perception between the 2 orders of presentations of some odour pairs, but not others. The results suggested additional studies which will lead to a psychometrics of individual differences in odour quality perception. AS

## 30

**[Sensory evaluation of migration of phenol from phenol-epoxide lacquers.]** Sensorische Bewertung der Migration von Phenol aus Phenol-Epoxidlacken.

Golebiowski, T.; Kolek, J.

*Verpackung* 20 (4) 133-134 (1979) [De] [Inst. for Study of Products, Economic Acad., Krakow, Poland]

Phenol-epoxy lacquers used for coating of the interior of cans may influence the organoleptic properties of foods in the cans. Sensory threshold values for phenols which might migrate into foods from the lacquer were determined, and effects of drying conditions of the lacquer layer on the water-extractability of the constituents were investigated. Recommendations are given concerning introduction of new methods for manufacture of cans for foods. IN

## 31

**[The application of texturized soy and cottonseed in popular food products.]**

Gutierrez, C. L.

*Revista del Instituto de Investigaciones Tecnológicas* 21 (117) 8-39 (1979) [9 ref. Es] [Inst. de Investigaciones Tecnológicas, Bogota D.E. Colombia]

The incorporation of textured soy and cottonseed in traditional and popular foods was investigated, including evaluation of sensory properties determining their suitability (colour, taste, texture), and selection and development of recipes. Main applications were as meat extenders, meat substitutes, additives, cheese extenders, e.g. in hamburgers, sausages, meat pies, soups, rice dishes, cream desserts, crisps, and pandebono (a traditional cheese dish). Recipes were standardized for small scale and institutional use and are presented in tables. Products were completely accepted by school children, and by adults unaware of the substitution, while 60-80% accepted by adults aware of the substitution. Suggestions are made for colouring the texturized vegetable proteins according to their application, producing dry mixtures only requiring rehydration, various forms of the products, and their introduction into the market. RM

## 32

**The shelf life of canned foods.**

Hall, M. N.

*Nutrition and Food Science* No. 59, 2-5 (1979) [7 ref. En]



Whilst a can which has been properly manufactured, filled, sealed and processed can be guaranteed to be microbiologically stable, changes do occur during storage which affect the quality of the food contents.

The results of a study of canned food storage stability are discussed, referring to sensory attribute changes and nutritional aspects of the deterioration. In general, sensory evaluation has shown only small changes with time, usually in colour and flavour associated with, and probably caused by, very high metal levels. Interactions of the food with the can material may result in dissolution of metals from the can, notably Sn, Fe and Pb (from the solder seams). Pb contents change extremely slowly, and do not limit the shelf life of canned foods, and Fe dissolution is usually accompanied by excessive amounts of Sn; these often limit the storage period of more corrosive packs. JRR

### 33

[Taste threshold values for metallic salts in different media.] Der Reiz- und Erkennungsschwellenwert für Metallverbindungen in verschiedenen Prüfmedien. Zacharias, R.; Tuorila, H.

*Lebensmittel-Wissenschaft und -Technologie* 12 (1) 36-40 (1979) [26 ref. De, en] [Bundesforschungsanstalt für Ernährung, Inst. für Hauswirtschaft, Garbenstrasse 13, 7000 Stuttgart 70, Hohenheim, Federal Republic of Germany]

After tests with  $\text{FeSO}_4$ ,  $\text{CuSO}_4$  and  $\text{SnCl}_2$ , solutions of  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$  were chosen for further study. Panels of 4 or 8 persons assessed  $\text{Fe}^{2+}$  taste threshold values in water at 1-160 mg/l by the German Federal Republic Standard DIN 10959 (1977) procedure and at 1-15 mg/l by the German Federal Republic Standard DIN 10954 (1977) paired-comparison procedure; in orange juice at 3-75 mg/l by DIN 10954; and in milk at 15-120 mg/l by DIN 10959 and at the 1-120 mg/l range by DIN 10954. The procedures are described and the results are statistically evaluated. Detection thresholds were 1 mg/l milk, 3 mg/l water and 15 mg/l orange juice; and recognition thresholds were 10 mg/l water, 30 mg/l milk, and 66 mg/l orange juice. SKK

### 34

Sensory characterisation of the flavour of beer. (In 'Progress in flavour research' [see FSTA (1980) 12 4T194].) [Lecture]

Clapperton, J. F. pp. 1-14 (1979) [26 ref. En] [Brewing Res. Foundation, Nutfield, UK]

Establishment of the 3-way connections between the sensory, physicochemical and processing parameters of beer flavour was sought. Sensory characterization was used to break down the overall impressions of beer flavours to their components. Using the profiling method originally developed by Harper et al. [British Journal of Psychology (1968) 59, 231; Perfumery and Essential Oil Record (1968) 59, 22] an attempt was made to reconstruct the flavour from the knowledge of the sensory qualities displayed by individual chemical constituents. Panel training and flavour profiles of beer are discussed. The statistical analysis of profile data using multivariate methods (discriminant analysis and

stepwise discriminant analysis, cluster analysis, and principal components analysis) is discussed. SP

### 35

Determination of personal and group thresholds and the use of magnitude estimation in beer flavour chemistry. (In 'Progress in flavour research' [see FSTA (1980) 12 4T194].) [Lecture]

Meilgaard, M. C.; Reid, D. S. pp. 67-73 (1979) [13 ref. En] [Stroh Brewery Co., Detroit, USA]

Interpersonal variations in the flavour impact of 4 principal aroma volatiles (ethanol, dimethyl sulphide, diacetyl, isoamyl acetate) of beer were studied. The 4 compounds were added to a light lager beer. Difference thresholds were determined using the American Society for Testing Materials 'ascending methods of limits'. Each compound was purified by a multistep process. Thresholds were determined at each step until further purification produced no change in threshold or flavour character. Personal threshold were determined for each of 16-20 assessors and magnitude estimation was used to measure the flavour effect of the 4 compounds in the suprathreshold range (2-8 times threshold concn.). SP

### 36

[Texture of bread. II. Estimation of the texture of bread by multi-point mensuration method and its correlation with mouth feel.]

Tsuji, S.

*Journal of Japanese Society of Food Science and Technology [Nippon Shokuhin Kogyo Gakkaishi]* 25 (6) 348-350 (1978) [10 ref. Ja, en] [Dep. of Food Sci., Osaka Shoin Women's Coll., Hishiya Nishi, Higashiosaka-shi, Osaka, Japan]

Correlations between parameters of cohesiveness (measured with tensipresser by multi-point mensuration method) and sensory mouth feel (softness and springiness) of commercial breads from 6 bakeries were investigated. An empirical formula of cohesiveness for each bread,  $y = ax + b$  ( $y$  = cohesiveness,  $x$  = clearance), was linear in a limited clearance;  $b$  and the masticating index of the bread were correlated to the evaluation by the sensory test, indicating that these parameters are useful for estimating bread texture in relation to mouth feel. AS

### 37

[Experiences and results of the 6th DLG Sensory Seminar.] Erfahrungen und Ergebnisse des 6. DLG-Sensorik-Seminars.

Seibel, W.

*Getreide, Mehl und Brot* 33 (6) 163-167 (1979) [6 ref. De] [Bundesforschungsanstalt für Getreide- & Kartoffelverarbeitung, Postfach 23, 4930 Detmold, Federal Republic of Germany]

Results of the 6th Seminar for training of sensory assessors organized by the DLG (Deutsche Landwirtschafts Gesellschaft; German Agricultural Society) are given. Participants were instructed in recognition of basic aromas and tastes of bakery products, then evaluated various types of bread and fine bakery products on the DLG 20-point scale. For each



product examined, the distribution of points awarded by the participants is given, and average score is compared with that given by expert assessors. Introduction of a new 5-point scale is briefly discussed, and it is concluded that this change will present no problems to properly trained assessors. It is intended to award a pass certificate to successful participants of the 7th Seminar. [See FSTA (1978) 10 12M1132 for report of 5th Seminar.] DIH

### 38

[Influences of oil and fats in foods on "five tastes".] Ohta, S.; Sakamoto, Y.; Kondo, K.; Kusaka, H. *Journal of Japan Oil Chemists' Society [Yukagaku]* 28 (5) 321-327 (1979) [4 ref. Ja, en] [Kitasato Univ., School of Fisheries Sci., Japan]

Effects of oil on the 5 tastes - sweet, salty, sour, bitter and glutamate taste, represented by sugar, salt, tartaric acid, quinine hydrochloride and monosodium glutamate - were investigated by panel tests. 1:1 and 1:3 water/oil (W/O) and oil/water (O/W) emulsions of 5.46% cane sugar solution and corn oil were made and tested against sweetness of 7.20, 6.28, 5.46, 4.75 and 4.13% cane sugar solution. Difference tests were also carried out on 7.20-4.13% cane sugar W/O and O/W emulsions. Similar tests were done on the 4 other tastes and on some real foods (margarine, cream, mayonnaise). Tabulated results showed that taste intensity was much reduced in W/O emulsions. Difference tests on W/O and O/W emulsions showed that differences in concn. were much more difficult to detect than in aqueous solutions. The results provide some explanation of the belief that oil makes the taste of food mild and delicious. RM

### 39

**Variation and repeatability of an untrained beef sensory panel.**

Hovenden, J. E.; Dutson, T. R.; Hostetler, R. L.; Carpenter, Z. L.

*Journal of Food Science* 44 (6) 1698-1601 (1979) [En] [Dep. of Anim. Sci., Texas A&M Univ., College Station, Texas 77843, USA]

Estimates were made of panel variation and of repeatability for an untrained sensory panel using beef loins as the test product. Prior to testing, the beef loins were placed in 1 of 3 groups (tender, intermediate, tough) based on Warner-Bratzler shear value. The sensory panel evaluated each steak for juiciness, tenderness, connective tissue amount, flavour desirability and overall desirability using an 8-point scale. The accuracy of the untrained panel was not different from the accuracy of trained sensory panels. A considerable amount of variation was observed for individual judges, but this did not affect the accuracy of the panel as a whole. The repeatability of the panel and of individual judges was used as a measure of precision. The repeatability of the whole panel was much higher than the repeatability of the individual judges. Tenderness was found to be the most repeatable palatability characteristic evaluated. The panel as a whole of each individual judge were more repeatable or precise in their evaluation of 9-samples/session than

3 samples/session. This indicates that no panel fatigue occurred during this study. Repeatabilities for the panel and the individual judges were found to be higher for the tougher loins than for more tender loins. IFT

### 40

**Effect of maturity and marbling on the myofibril fragmentation index of bovine longissimus muscle.**

Parrish, F. C., Jr.; Vandell, C. J.; Culler, R. D.

*Journal of Food Science* 44 (6) 1668-1671 (1979) [En] [Dep. of Anim. Sci., Iowa State Univ., Ames, Iowa 50011, USA]

Myofibril fragmentation index (MFI), sarcomere length, total and soluble collagen, Warner-Bratzler shear and sensory tenderness were determined on loin steaks from carcasses that varied in marbling, maturity and composition. Loin steaks from 72, A, 11 B, 19 C and 22 E maturity beef carcasses were removed at 10-14 days of postmortem storage at 2°C. Steaks were double wrapped in freezer paper and stored at -29°C until the samples were used for analysis. MFI was significantly related to sensory tenderness scores as evidenced by the correlation coeff. of 0.66, 0.77, 0.75 and 0.71 for A, B, C and E maturities, resp., and 0.76 for all maturities. MFI of loin steaks from A maturity were significantly different from MFI of loin steaks from B, C and E maturity carcasses. Differences in MFI among marbling groups within A maturity were found only at the lowest degree of marbling (practically devoid). Therefore, it seems that MFI could be useful as a criterion of quality for A, B, C and E maturity carcasses, and especially A maturity carcasses without being significantly affected by marbling degree or carcass composition. The results further substantiate the use of myofibril fragmentation tenderness as a term to describe a state of tenderness of conventionally aged bovine longissimus muscle. IFT

### 41

**Meat flavour and consumer acceptability.** (In 'Progress in flavour research' [see FSTA (1980) 12 4T194].) [Lecture]

Rhodes, D. N.

pp. 307-319 (1979) [6 ref. En] [Meat Res. Inst., Bristol, UK]

The positive aspect of meat flavour, i.e. what constitutes the delicious odour universally recognised on eating and how it can be maintained, enhanced or intensified, is considered and discussed under the following headings: taste and odour by physical methods; instrumental vs. panel work; sensory assessment of meat flavour; the development of a sensory profile; the use of words; can we use vectors?; a model system; and flavour and the consumer. SP

### 42

**Effect of chilling and frozen storage on quality of chicken meat.**

Pandey, N. K.; Mahaderan, T. D.

*Indian Poultry Gazette* 63(2) 64-71 (1979) [24 ref. En] [Div. of Poultry Res., Indian Vet. Res. Inst., Izatnagar, Uttar Pradesh, 243 122, India]



(i) Leg and (ii) breast muscles of chicken were chilled for 1, 2, 3 and 4 h and frozen stored at  $-16 \pm 1^\circ\text{C}$  for 60 days; they were examined at intervals of 15 days for 2-thiobarbituric acid (TBA) values, total bacterial load, moisture and protein %, and storage loss and drip loss. TBA value in (i) and (ii) increased up to 30 days of storage after which it decreased at 45 days and then again increased at 60 days. TBA values were higher in (i) than in (ii) subjected to the same treatment. Bacterial loads on the skin surface of both (i) and (ii) were inversely proportional to the duration of storage and h of chilling. Duration of chilling did not significantly affect the moisture content of (i) and (ii); freezing for 60 days significantly decreased the moisture content of (i). Duration of frozen storage and chilling did not influence the total protein content of (i) and (ii), but significantly affected the freezing/storage loss, thawing loss and drip loss. 4 h chilled birds were consistently preferred for overall acceptance by a panel of judges over those chilled for shorter periods. CFTRI

## 43

### Progress in flavour research. [Book]

Land, D. G.; Nursten, H. E. (Editors)  
xvi + 371pp. ISBN 0-85334-818-9 (1979) [many ref. En]  
Barking, Essex, UK; Applied Science Publishers Ltd.  
Price £22.00 [Food Res. Inst., Norwich, Norfolk, UK]

This book is the Proceedings of the 2nd Weurman Flavour Research Symposium held at the University of E. Anglia, Norwich, 2-6 April, 1978. Chapters include: 1. Sensory characterization of the flavour of beer, by J. F. Clapperton (pp. 1-14, 26 ref.). 2. Sensory methods in the work of the flavour chemist, by M. Seidman (pp. 15-26, 5 ref.). 3. Application of anatomical and psychophysical methods to studies of odour interactions, by D. G. Laing & H. Panhuber (pp. 27-46, 45 ref.). 4. Some psychophysical notes on the use of the odour unit number, by J. E. R. Frijters (pp. 47-51, 22 ref.). 5. Some factors influencing the perception of flavour contributing substances in food, by D. G. Land (pp. 53-66, 42 ref.). 6. Determination of personal and group thresholds and the use of magnitude estimation in beer flavour chemistry, by M. C. Meilgaard & D. S. Reid (pp. 67-73, 13 ref.). 7. An approach to meat flavour research with evaluation by the dog and cat, by P. Booth (pp. 75-77, 3 ref.). 8. Review of isolation and concentration techniques, by J. M. H. Bemelmans (pp. 79-98, 50 ref.). 9. Application of gas and thin-layer chromatography in flavour analysis, by A. M. Humphrey (pp. 99-118, 6 ref.). 10. Recent studies in flavour chemistry and related fields undertaken in the food research laboratory of CSIRO, by F. B. Whitfield & K. E. Murray (pp. 119-127, 20 ref.). 11. Deactivation of a metal transfer line between a gas chromatographic column and a flame photometric detector, by J. W. Gramshaw & A. Hussain (pp. 129-134, 15 ref.). 12. Developments in mass spectrometry, by R. Self (pp. 135-143, 49 ref.). 13. Applications of alternative scan positive ion-negative ion chemical ionisation in gas chromatography-mass spectrometry, by S. Evans & R. Skinner (pp. 145-149, 8 ref.).

[Continued in following abstract.] SP

## 44

### Progress in flavour research. [Book]

Land, D. G.; Nursten, H. E. (Editors)  
xvi + 371pp. ISBN 0-85334-818-9 (1979) [many ref. En]  
Barking, Essex, UK; Applied Science Publishers Ltd.  
Price £22.00 [Food Res. Inst., Norwich, Norfolk, UK]

[Cont. from preceding abstract.] 14. Optimised coupling techniques for gas chromatography-mass spectrometry in flavour research, by U. Rapp, M. Höhn & G. Dielmann (pp. 151-158, 2 ref.). 15. Review of biosynthesis of volatiles in fruits and vegetable since 1975, by C. E. Eriksson (pp. 159-174, 54 ref.). 16. The role of microorganisms in flavour formation by P. Schreier (pp. 175-196, 72 ref.). 17. Chemical formation of flavour substances, by R. Tressl, K. G. Grünwald, R. Iwar, & D. Bahri (pp. 197-213, 53 ref.). 18. Differences between the volatile compounds of cultivated and wild strawberries (*Fragaria vesca* L.), by T. Pyysalo & E. Honkanen (pp. 215-218, 12 ref.). 19. Volatile components from thermally degraded thiamine, by L. M. van der Linde, J. M. van Dort, P. de Valois, H. Boelens & D. de Rijke (pp. 219-224, 14 ref.). 20. Factors affecting flavour during growth, storage and processing of vegetables, by G. G. Freeman (pp. 225-243, 47 ref.). 21. Flavour formation in dairy products, by J. P. Dumont & J. Adda (pp. 245-262, 58 ref.). 22. Reduction of cooked flavour in heated milk and milk products, by H. T. Badings (pp. 263-265, 2 ref.). 23. Changes in flavour compounds of black pepper during heat sterilization, by H. Maarse & L. M. Nijssen (pp. 267-274, 15 ref.). 24. The formation of metallic taint by selective lipid oxidation: the significance of octa-1, cis-5-diene-3-one, by P. A. T. Swoboda & K. E. Peers (pp. 275-279, 15 ref.). 25. The glucosinolates of two species of *Farsetia*, by V. Gil & A. J. MacLeod (pp. 281-285, 5 ref.). 26. The evaluation of flavour quality in fruits and fruit products, by A. A. Williams (pp. 287-305, 63 ref.). 27. Meat flavour and consumer acceptability, by D. N. Rhodes (pp. 307-319, 6 ref.). 28. The bitterness of protein hydrolysates, by J. P. Roozen (pp. 321-326, 11 ref.). 29. Problems in flavour application in food systems, by B. King, R. Wyler & J. Solms (pp. 327-335, 12 ref.). 30. Why flavour research? How far have we come since 1975 and where now? by H. E. Nursten (pp. 337-355, 44 ref.). A 9 pp. subject index is also included. Chapters 1, 3, 5, 6, 9, 11, and 14-29 are abstracted separately in FSTA and are listed in the author index under Weurman Flavour Research Symposium [2nd Symposium]. SP

## 45

### The umami taste.

Yamaguchi, S.

### Abstracts of Papers, American Chemical Society 177

(1) AGFD 64 (1979) [En] [Cent. Res. Lab., Ajinomoto Co. Inc., Suzuki-cho, Kawasaki-ku, Kawasaki 210, Japan]

The characteristic taste of monosodium L-glutamate (MSG) or 5'-ribonucleotides (RN) is called 'umami' in Japanese. It plays a predominant role in the flavour of foods. The author has systematically investigated the sensory aspects of umami substances by psychometric methods, and clarified both fundamental taste



properties and actual flavour effects of various umami substances added to food. The taste quality of umami is independent from the traditional 4 basic tastes. It neither intensifies nor is intensified by them. Umami is an intrinsic taste. The umami substances added to food not only give their intrinsic taste to the food, but enhance such flavour characteristics of food as continuity, mouthfulness, impact, mildness and thickness; thus, they increase the palatability of food. A remarkable synergistic effect of umami is observed between MSG and RN, which can be expressed by a simple mathematical model. AS

## 46

[Meat. Methods of sampling and organoleptic methods for determination of freshness.]

Union of Soviet Socialist Republics, Gosudarstvennyi Komitet SSSR po Standartam

*Soviet Standard GOST 7269-79*, 5pp. (1979) [Ru]

This standard, which partially supersedes GOST 7269-54, applies to beef, mutton, pork and other meats, and to by-products, with the specific exclusion of liver, brains, lungs, spleen and kidneys. Samples must be of  $\geq 200$  g from specific parts of the carcass. Organoleptic tests cover consistency, odour, condition of fat and tendons and clarity and aroma of broth. Characteristics of 'fresh', 'doubtful' and 'not fresh' samples are tabulated. HBr

## 47

[Milk and dairy products. Sensory testing. General principles.] Milch und Milcherzeugnisse. Sensorische Qualitätsprüfung. Allgemeine Grundsätze.

German Democratic Republic, Institut für Milchwissenschaft der DDR

*German Democratic Republic Standard TGL 26208/01*, 11pp. (1977) [De]

Aspects covered include: definition of concepts and terms; requirements concerning personnel and facilities; transport, storage and preparation of samples; conduct of the test; grading of each characteristic on a 6-point scale; and interpretation and evaluation of the results. AJDW

## 48

[Milk and dairy products. Sensory testing. Cheese from soured skim milk curd.] Milch und Milcherzeugnisse. Sensorische Qualitätsprüfung. Käse aus Sauermilchquark.

German Democratic Republic, Institut für Milchwissenschaft der DDR

*German Democratic Republic Standard TGL 26208/09*, 7pp. (1977) [De]

This standard, which supersedes standard TGL 26208/11 issued in 1971, specifies a procedure for evaluation of the sensory quality of this type of cheese. External appearance, internal appearance/structure, aroma and flavour are each evaluated on a 6-point scale; weighting factors for these scores are 0.9, 0.7, 0.4 and 2.0 resp., giving max. total scores of 4.5, 3.5, 2.0 and 10.0 points for these properties, resp. Detailed descriptions are given of typical characteristics of cheeses (Gelbkäse, Edelschimmelkäse and Kochkäse)

awarded 0, 1, 2, 3, 4 or 5 points for each of the 4 properties considered. AJDW

## 49

[Milk and dairy products. Sensory testing. Processed cheese.] Milch und Milcherzeugnisse. Sensorische Qualitätsprüfung. Schmelzkäse.

German Democratic Republic, Institut für Milchwissenschaft der DDR

*German Democratic Republic Standard TGL 26208/10*, 6pp. (1977) [De]

This standard specifies a scheme for sensory evaluation of sliceable and spreadable types of processed cheese and processed cheese preparations. External appearance, internal appearance/structure, aroma and flavour are each evaluated on a 6-point scale; weighting factors are 0.9, 0.7, 0.4 and 2.0 resp. for these characteristics, giving total weighted point scores of 4.5, 3.5, 2.0 and 10.0 resp. Detailed descriptions are given of typical characteristics of cheese samples graded 0, 1, 2, 3, 4 or 5 for each of the 4 properties considered. AJDW

## 50

[Survey of methods for statistical analysis of taste panel data.]

Tomassone, R.; Flanzy, C.

*Annales de Technologie Agricole* 26 (4) 373-418

(1977) [34 ref. Fr, en] [Lab. de Biometrie, INRA, 78350 Jouy en Josas, France]

Statistical analysis of the results of taste panel studies on foods is discussed. Aspects considered include: Friedman's 2-way variance analysis; classical variance analysis; analysis of dichotomous data (i.e. acceptable/unacceptable scoring); Kendall's coeff. of concordance; Kramer's test; multiple comparison methods; Page's predetermined order test; Spearman's range correlation test; multivariate analysis methods; principal component analysis; correspondence analysis; canonical variate analysis; principal coordinate analysis; and procustean analysis. The relative merits and applications of these methods are discussed. AJDW

## 51

Formulation and evaluation of a low pH egg salad.

Simmons, S. E.; Page de Bartolucci, D.; Stadelman, W. J. *Journal of Food Science* 44 (5) 1501-1504, 1509 (1979) [26 ref. En] [Dep. of Anim. Sci., Purdue Univ., West Lafayette, Indiana 47907, USA]

A low-pH egg salad was formulated as an attempt to control microbial growth and to minimize public health hazards associated with egg salads. 3 formulations of salad were developed with different levels of acidity, ranging from pH 4.25 to 4.30. Commercially prepared hard-cooked eggs and acidic salad dressings were used in the formulation as well as an experimentally prepared soy-based salad dressing. Consumer acceptance was evaluated using an experienced 6-member sensory panel. The low-pH egg salads were given favourable ratings by the sensory panel, using a hedonic rating scale and triangular testing. After sensory evaluation, the preferred formulation was



inoculated with *Salmonella seftenberg* to determine whether or not bacterial inhibition was exerted by the low-pH egg salad. A commercial sample of egg salad also was inoculated and bacterial growth in the 2 salads was studied for 60 h, at storage temp. of 5°C and 22°C. Samples taken from all acidic egg salad samples at 12 h intervals showed dramatic decreases in *Salmonella* numbers, especially during storage at room temp. (22°C). Shelf life of the product was determined to be >5 wk under refrigeration at 5°C. IFT

## 52

### Flavour characterization by trained and untrained assessors.

Clapperton, J. F.; Piggott, J. R.

*Journal of the Institute of Brewing* 85 (5) 275-277 (1979) [7 ref. En] [Brewing Res. Foundation, Nutfield, Redhill, Surrey, UK]

The flavours of 4 beers were characterized by 4 panels of assessors, using a flavour profiling system. One panel carried out duplicate assessments. Results showed that training and experience improved reproducibility and discrimination, without distorting the general pattern of flavour terms reported. On the basis of the flavour profiles, assessors could be divided into novices, those with some experience, and experts. Those novices likely to be good assessors could also be identified. AS

## 53

### Magnitude estimation of infant foods. I. Taste and texture of pureed vegetables.

McDaniel, M. R.; Harasym, L. C.

*Canadian Institute of Food Science and Technology Journal* 12 (4) 180-185 (1979) [5 ref. En, fr] [Dep. of Foods & Nutr., Univ. of Manitoba, Winnipeg, Manitoba, Canada]

The taste and textural properties of selected pureed vegetables were evaluated on a qualitative and quantitative basis by a trained sensory panel using magnitude estimation. Commercially canned (Heinz) and frozen home prepared (pureed frozen vegetables) peas, beans, carrots and corn were evaluated for overall flavour intensity, vegetable flavour intensity, sweetness, bitterness, sourness, viscosity, dryness, mouthcoat, adhesiveness, chalkiness and pulpiness. All vegetable samples were found to be in varying degrees sweet, viscous, drying and exhibited some vegetable-like flavour. In some cases the overall flavour impact was due more to sourness and bitterness than to the expected typical vegetable flavour. Many of the vegetables were very complex in texture while basically bland in flavour. The placement of the pureed products on the basic taste power functions allows a direct comparison of the intensity of the product to that of a pure tastant. AS

## 54

[Consumer trials with bread containing mould-control agents.] Schimmelschutz im Verbrauchertest. Lück, E.; Remmert, K.-H.

*Backtechnik* 27 (4) 15-16 (1979) [De] [Hoechst AG,

6230 Frankfurt 80, Federal Republic of Germany]

Incorporation of mould-control agents commonly influences the aroma and flavour of bread; however, industrially prepared sliced bread commonly contains mould control agents because of the high risk of microbial spoilage. Studies were conducted on the organoleptic properties of sliced bread ('toast bread' and rye/wheat mixed bread) made with 0.15% sorbic acid (Panosorb) or 0.45% calcium propionate. Control samples contained no anti-mould agent. 104 panellists evaluated the toast bread; 122 evaluated the rye mixed bread. Samples were evaluated in triangle tests, or by comparison with the control bread. The majority of panellists considered the samples with 0.15% sorbic acid to be superior to those with 0.45% calcium propionate. IN

## 55

### [Relationships between colour and taste in foods.]

Beziehungen zwischen Farbe und Geschmack bei Lebensmitteln.

Kynast, U.

*Deutsche Milchwirtschaft* 30 (35) 1258, 1260, 1270 (1979) [De]

Maturation of colourless brandy in oaken casks for development of brown colour; brewing of lager beer, Pilsen type in particular, from pale malt or with active carbon treatment to achieve pale colour; and addition of ammoniated caramel to colourless Cola beverages to achieve brown colour are quoted as examples of association of a given food product with a colour considered characteristic for it. 30 men and women aged 17-35 forming an expert tasting panel of a beverage factory producing a cola beverage were offered a glass of a fully ripened colourless cola beverage made by an international food concern and asked to say what it was; 2 experts said it was a cola beverage without colouring, 4 thought it similar to cola, more than half the experts were unable to describe the taste, and 6 thought it was an artificially sweetened drink, juice or a lemonade. In a further test, they were asked to decide whether it was a cola beverage, an exotic beverage, or some other beverage; 40, 30 and 30% of the experts favoured the descriptions in the stated sequence. Finally, the experts were blindfolded and offered a glass of the colourless product and a glass of a genuine cola beverage described to them by name; 20 experts pointed out the latter as genuine, and 10 pointed out the control. SKK

## 56

### Preference behaviour and chemoreception.

Proceedings of a symposium at 'Het Meerdal', Horst, Netherlands, 15-17 May 1979. [Conference proceedings]

Kroeze, J. H. A. (European Chemoreception Research Organization) (Editor)

353pp. ISBN 0-904147-12-6 (1979) [many ref. En]

1 Falconberg Court, London, UK; Information Retrieval Ltd. Price £12.00; \$26.00

Papers presented at this symposium are arranged under the following 4 sections: Sensory determinants of preference (pp. 9-147); Toward a formal view of



preference behaviour (pp. 149–170); Preference in an ecological context (pp. 171–245); and Preference as an expression of need, culture and attitudes (pp. 247–334). Papers presented include: Informational deficiencies and preference in human chemoreception, by M. G. J. Beets (pp. 23–37). Preference changes: sensory vs. hedonic explanations, by L. M. Bartoshuk (pp. 39–50, 23 ref.). Gustatory preference behaviour in primates, by D. Glaser (pp. 51–61, 14 ref.). Preference: a multidimensional concept, by S. S. Schiffman (pp. 63–81, 20 ref.). Descriptive and emotional profiles of odours and their preferences, by M. Yoshida (pp. 83–92, 15 ref.), including essential oils and spices. Hedonic response and perceived characteristics of odours in man, by D. G. Land (pp. 93–106, 14 ref.). Likes and dislikes, and preferences in man: methodological and other considerations, by R. Harper (pp. 123–130, 11 ref.). Mind, body and pleasure: an analysis of factors which influence sensory hedonics, by H. R. Moskowitz (pp. 131–147, 9 ref.). Models and methods for the study of chemoreception-hedonics, by C. H. Coombs (pp. 149–170, 15 ref.). The origin of preferences in taste and smell, by T. Engen (pp. 263–273, 25 ref.). Gustatory pleasure and body needs, by M. Cabanac (pp. 275–288, 79 ref.). Preference and affect in food selection, by P. Rozin (pp. 289–302, 18 ref.). Lability of odour pleasantness, by W. S. Cain (pp. 303–315, 13 ref.). Preference as a motive, by D. A. Booth (pp. 317–334, 52 ref.). VJG

## 57

**The psychophysical analysis of food perception: models and approaches.**

Moskowitz, H. R.; Chandler, J.

*Lebensmittel-Wissenschaft und -Technologie* 12 (5) 293–300 (1979) [13 ref. En] [MPi Sensory Testing, Inc., 770 Lexington Avenue, New York, 10021, USA]

The psychophysical analysis of odour mixtures (2 odorants, each at 4 concn.) and sweetened fruit flavoured drinks (5 levels of sucrose and 5 levels of flavouring) using a selected panel demonstrated that the psychological terms of sensory perception, developed for model systems such as simple odour mixtures, can be also used to describe the sensory and hedonic responses to simple foods, such as sweetened fruit flavoured drinks; the data agreed with those obtained from other sources. In an experiment, in which a more complex food, such as spicy meat sauce (4 ingredients, each at 3 levels), was evaluated by a taste panel, the full evaluation would have required 81 different product formulations. When, for practical purpose, an experimental design comprising only 27 of the possible 81 formulations was used, providing for the evaluation of 3 levels of each of the 4 ingredients, and a representative (but by no means complete) set of interactions, the regression equations relating ingredients to perception showed a positive relationship between sensory perceptions and ingredients. Furthermore, for the psychophysical approach a simplified scheme was devised by asking the panelists to arrange 10 specific sensory characteristics + overall like/dislike for each test formulation by magnitude estimation. Also, the same panelists were asked to compose an ideal product by using the same magnitude estimation scales but the same attributes as used for the 27 test products. ESK

## 58

**[Sensory perception and evaluation of food texture.]** Pompei, C.

*Industria Conserve* 54 (4) 273–295 (1979) [49 ref. It, en] [Istituto di Tecnologie Alimentari, Via Celoria 2, Milan, Italy]

This review includes a critical examination of the problems involved in sensory perception and evaluation of food texture, and the correlations between sensory and instrumental measurements of texture. AS

## 59

**Sensory assessment and chemical composition of drinking water, a study based on the situation in the Netherlands.**

Zoeteman, B. C. J.

*Dissertation Abstracts International, C* 38 (4) 653: 152pp. (1978) [En] [Rijksuniv., Utrecht, Netherlands]

The main purpose of the study was to assess the suitability of sensory evaluation of water for indicating (i) the presence of chemical contaminants and (ii) potential ill-effects on the health of consumers. The study included evaluation of the taste and smell of 20 types of drinking water by a taste panel and analysis of the water types for organic compounds. Of the 280 compounds detected, 20 were selected as being probably involved in taste impairment. The results of this and previous studies indicated that smell can serve as a sensitive indirect warning of the presence in drinking water of potentially toxic compounds; however, absence of bad taste or smell does not necessarily guarantee the safety of the water. Inorganic constituents (e.g.  $\text{NaHCO}_3$ ,  $\text{CaSO}_4$ ) were found to contribute, at the levels detected, more to the desirable neutral taste of water than to taste impairment. JA

## 60

**Multi-plant beer flavor monitoring.**

Rehberger, A. J.; Cutaita, A. J.; Heintz, O. E.

*Technical Quarterly, Master Brewers' Association of the Americas* 16 (2) 53–59 (1979) [2 ref. En, es] [Jos. Schlitz Brewing Co., Milwaukee, Wisconsin, USA]

This paper describes a flavour evaluation system for monitoring the flavour quality of a var. of products in a multi-plant operation. The system is composed of a beer flavour profile method in which 14 selected attributes are scored, a system of training and qualifying taste panelists at 9 locations and a method of reporting and evaluating data. The system provides a mechanism for measuring the flavour acceptance of a beer and determines the reasons for good or poor flavour by statistical examination of the data for the specific flavour attributes. AS

## 61

**[Wine tasting.]** Degustatsiya vin. [Book]

Almashi, K. K.; Drboglav, E. S.

150pp. (1979) [26 ref. Ru] Moscov, USSR; Pishchevaya Promyshlennost'. Price 0.45r

Up-to-date information on judging wine quality is presented. Chapters are: Principles of sensory tests (pp. 7–21); General rules for wine tasting (pp. 22–33); Sensory analysis (pp. 34–58); Processing of results (pp.



59-76); Special methods of sensory analysis (pp. 79-94); Education of tasting panels (pp. 95-107); Characteristics of some special wines, and their tasting (pp. 108-126); and Wine competitions (pp. 127-139). STI

## 62

**Acceptability and properties of carbonated apple juice.**

Bright, R. A.; Potter, N. N.

*Food Product Development* 13 (4) 34, 36-37 (1979)

[En][Dep. of Food Sci., Cornell Univ., Ithaca, New York 14850, USA]

Apple juice concentrate with 82% total soluble solids was diluted to 15% soluble solids with water and with water and carbonated water, and offered to lunchtime customers of a university cafeteria. Respondents were asked to rank each sample on a 7-point hedonic scale. In a storage study bottles of refrigerated, pasteurized (i) carbonated and (ii) uncarbonated apple juice were divided into 3 groups and stored at  $45 \pm 4^\circ\text{F}$ ,  $72 \pm 3^\circ\text{F}$  and  $85 \pm 2^\circ\text{F}$ , and evaluated for appearance, taste and overall acceptability using a 9-point hedonic scale. Average hedonic score in the cafeteria trial was 5.7 for (ii) and 4.6 for (i). Both drinks were liked but probably would have ranked higher if the juice had been less sweet and lighter in colour. 66.7% preferred (ii), 32.1% preferred (i) and 1.2% had no preference. Results of the storage study showed that storage time and temp. had statistically significant effects on pH. Titratable acidity was much higher in (i) than in (ii) juice, and was unaffected by storage temp. The apple juice was fortified with 40 mg ascorbic acid/100 ml. The level of vitamin C dropped during storage and after 8 wk it stabilized at 29 mg/100 ml in both (i) and (ii). Storage temp. did not affect vitamin C level. The decrease in hedonic rankings was statistically significant and was independent of length of storage time and carbonation. The decrease was greatest for drinks stored at  $85^\circ\text{F}$ , less for those stored at  $45^\circ\text{F}$  and least for those stored at  $72^\circ\text{F}$ . Taste panel liked the appearance of (i) slightly more than (ii). Product stored at  $72^\circ\text{F}$  was liked most, those stored at  $45^\circ\text{F}$  liked less, and those stored at  $85^\circ\text{F}$  liked least. VJG

## 63

**Sensory evaluation of dairy products.**

Gupta, S. K.; Patel, A. A.

*Indian Dairyman* 31 (10) 697-700 (1979) [2 ref. En]

[Dairy Tech. Div., Nat. Dairy Res. Inst., Karnal-132 001, Haryana, India]

## 64

**Psychophysical aspects of sensory analysis of dairy products: a critique.**

O'Mahony, M.

*Journal of Dairy Science* 62 (12) 1954-1962 (1979)

[35 ref. En][Dep. of Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

This review article highlights some of the psychophysical principles of 3 common types of sensory testing procedures with human judges. These are: intensity scaling, difference tests and descriptive analysis. Limitations of each procedure are discussed,

and the necessity for taking great care in selecting appropriate test procedures and statistical analyses for use in sensory analysis of dairy products is pointed out. MEG

## 65

**Sensory detection of off-flavors in milk incorporating short-cut signal detection measures.**

O'Mahony, M.; Kulp, J.; Wheeler, L.

*Journal of Dairy Science* 62 (12) 1857-1864 (1979)

[8 ref. En][Dep. of Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

A short and simple multiple difference test is outlined for the sensory analysis of milk; the procedure gives Signal Detection measures of difference. The measures are general in that they are obtained readily either by ranking or rating. After a study to determine the type of cup required for tasting, a ranking procedure was adopted to measure differences in flavour between milk samples stored in polyethylene and glass and to determine degrees of off-flavour in milk caused by addition of copper. The ranking method was simple and efficient for testing multiple differences. AS

## 66

**Measurement and prediction of tenderness in six beef muscles.**

Joseph, R. L.; Connolly, J.

*Meat Science* 3 (1) 21-29 (1979) [20 ref. En][Meat Res.

Dep., An Foras Taluntais, Dunsinea, Castleknock, Co. Dublin, Irish Republic]

Carcasses of 27 heifers were subjected to various treatments influencing tenderness (slow, medium or fast chilling; normal or 'tenderstretch' suspension of the carcass; ageing for 2, 7 or 14 days). Samples of cooked *longissimus dorsi* (LD), *psaos major* (PM), *biceps femoris* (BF), *semitendinosus* (ST), *semimembranosus* (SM) and *gluteus medius* (GM) muscles were assessed subjectively by a panel rating tenderness on a 9-point scale, and also measured objectively by means of the Volodkevitch bite tenderometer 'max. force exerted', and 'total work done' values. Tables and graphs of data are given for objective and subjective tenderness characteristics of the muscles studied, and the regressions of panel scores on the objective tenderness measures. The results show that panel score was well predicted by both objective measures for LD and SM; for GM, prediction was less significant. For PM, the panel score could be adequately predicted only by the total work done value. No significant prediction was possible for BF and ST. These differences between muscles are discussed. The potential for use of 1 muscle as an index of the tenderness of others was investigated; correlations were low, and of no practical value. AJDW

## 67

**Chemical, physical, curing and sensory properties of hams from Yorkshire, crossbred and wild pigs.**

Townsend, W. E.; Brown, W. L.; McCampbell, H. C.; Davis, C. E.

*Journal of Animal Science* 49 (5) 1219-1226 (1979)

[18 ref. En][USDA, Richard B. Russell Agric. Res. Cent., Athens, Georgia 30604, USA]



Various chemical, physical, curing and sensory properties were evaluated on a limited number of cured hams from (i) Yorkshire (*Sus domesticus*), (ii) wild (*Sus scrofa*) and (iii) crossbred (Yorkshire  $\times$  wild) pork carcasses. For stitch pumped (SP) hams, wt. loss during processing, pH, % moisture, protein, fat and salt were not affected by phenotype. For dry cured (DC) hams, wt. loss during curing was greatest ( $P < 0.05$ ) for (i), least for (ii) and intermediate for (iii). Fat content was highest and salt content was lowest in DC ham slices from (i); the reverse was true for (ii), and (iii) were intermediate. Fatty acid composition showed few significant ( $P < 0.05$ ) differences among phenotypes. In general, colour of hams was darkest and red colour was most intense for (ii). Cooking time was longer ( $P < 0.05$ ) and shear values were higher ( $P < 0.05$ ) for ham slices from DC than SP hams. Within curing method, shear values did not differ among phenotypes. Total cooking loss was higher ( $P < 0.05$ ) from SP than from DC hams; within curing methods, cooking loss was generally greater for (i) than (ii) and was intermediate for (iii). For (ii) and (iii), taste panelists rated DC hams more ( $P < 0.05$ ) salty, less ( $P < 0.05$ ) tender and less acceptable than SP hams. Within curing methods, panel scores for saltiness did not differ among phenotypes. Panel scores of SP hams for tenderness, juiciness and overall acceptability did not differ among phenotypes. No particular chemical, physical, curing or sensory benefits were achieved by crossing (i) with (ii) swine. AS

## 68

**Effect of formic acid treatment of chicken feed on the taste of the resultant broiler meat.**

Basker, D.; Klinger, I.

*Refuah Veterinarith* 36 (2) 40-42 (1979) [9 ref. En] [Agric. Res. Organization, Volcani Cent., Bet Dagan, Israel]

Addition of formic acid to animal feed has been suggested as a method for elimination of pathogenic microorganisms. Studies were conducted to determine whether feeding a diet containing 1.2% formic acid influenced the organoleptic properties of the meat of Leghorn meat race chickens, fed the experimental diet up to slaughter at 9 wk of age. Control chickens received a diet without formic acid. Carcasses of the experimental and control groups of chickens were stored at  $-18^{\circ}\text{C}$  for approx. 2 months, thawed, and dark and light meat were cooked separately in salted water. The organoleptic properties of the samples were then evaluated by a taste panel. The results show that taste panellists could not accurately differentiate between experimental and control samples. No significant difference was found in general quality, texture, juiciness or meatiness between the experimental and control meat samples; however, panellists expressed a preference for meat from the birds fed the formic acid-containing diet. AJDW

## 69

**[Food preserves. Methods for determination of sensory characteristics, net wt., and wt. of component parts.]**

Union of Soviet Socialist Republics, Gosudarstvennyi Komitet SSSR po Standartam

**Soviet Standard GOST 8756.1-79**, 7pp. (1979) [Ru]

This standard, which supersedes GOST 8756.1-70, applies to food preserves (e.g. canned, bottled), with the specific exclusion of dairy products. Sensory evaluation, covering appearance, colour, odour, consistency and taste, is carried out by a taste panel, after the products have satisfied preliminary microbiological and chemical analyses. Formulae for determining the wt. of the component parts are given. KME

## 70

**Experimental assessment of human olfactory thresholds in air for some thiols and alkanes.**

Patte, F.

*Chemical Senses and Flavour* 4 (4) 351-354 (1979)

[3 ref. En] [Physiologie de la Chimioréception, Groupe de Lab. du CNRS, 91190 Gif-sur-Yvette, France]

Human olfactory thresholds of 4 n-alkanes from C12 to C18 and 4 n-thiols from C4 to C12 were determined. Contrary to previous assumptions, the olfactory effectiveness of both these substance series increases with the number of carbon atoms in an almost linear fashion. AS

## 71

**Threshold determination by triangle testing: effects of judgemental procedure, positional bias and incidental training.**

McBride, R. L.; Laing, D. G.

*Chemical Senses and Flavour* 4 (4) 319-326 (1979)

[20 ref. En] [Food Res. Lab., CSIRO Div. of Food Res., North Ryde, NSW, 2113, Australia]

The NaCl detection threshold of 51 subjects was determined using a sequence of triangle tests in which the odd (NaCl) stimulus increased in concn. geometrically. Subjects served under 2 experimental conditions in which the judgemental procedure either was, or was not, specified. Judgemental procedure had no effect on discriminatory performance while threshold values obtained were lower than most reported in the literature. A significant positional-order bias was observed and performance improved significantly throughout the duration of the test. Reasons for the findings are discussed. AS

## 72

**Confusion in the use of the taste adjectives 'sour' and 'bitter'.**

O'Mahony, M.; Goldenberg, M.; Stedmon, J.; Alford, J.

*Chemical Senses and Flavour* 4 (4) 301-318 (1979)

[21 ref. En] [Dep. of Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

Subjects from Britain and America were tested on their skill at applying the taste adjectives 'sweet', 'sour', 'salty', and 'bitter' to clearly distinguishable solutions of sucrose, citric acid, NaCl and quinine sulphate, resp. The main error that occurred was calling citric acid 'bitter' while the tendency to call quinine sulphate 'sour' was not so common; this is the well known sour-bitter confusion. A sour-salty confusion was also noted as well as a tendency to call citric acid 'sweet'. All these confusions were rectified by mere definition using standards. Skill at applying taste adjectives was not



always found to be consistent over time. More errors occurred at lower solution concn., even though stimuli were clearly distinguishable; indistinguishability of stimuli may account for some confusions in other studies. AS

## 73

**Rating and ranking procedures for short-cut signal detection multiple difference tests.**

O'Mahony, M.; Garske, S.; Klapman, K.  
*Journal of Food Science* 45 (2) 392-393 (1980) [En]  
[Dep. of Food Sci. & Tech., Univ. of California, Davis, California 95616, USA]

A comparison is made between rating and ranking as methods for multiple difference testing for sensory analysis of food flavours. A signal detection index of difference is obtained and tends to be higher when obtained by ranking than by rating. The effect is predicted from probability assumptions made in the calculation of the index. IFT

## 74

**Sensory characteristics of some aroma compounds appearing as products of amino acid-sugar reactions.**  
Barylko-Pikielna, N.; Tuorila, H.; Pietrzak, E.  
*Nahrung* 24 (1) 21-28 (1980) [24 ref. En, de, ru] [Inst. of Food & Nutr., Warsaw, Poland]

Studies were conducted on the sensory properties of diacetyl, methional and dimethyl sulphide, considered as typical volatile reaction products of non-enzymic browning reactions in the presence of S compounds. Concn. effects on the aroma intensity, hedonic response characteristics and sensory similarity of these compounds were investigated. Graphs and diagrams of results are given, and discussed in detail. Considerable differences between results with different test personnel were observed, together with a high degree of dependence of the results on test method. IN

## 75

**The case for and against recruiting external panels for developmental product evaluation.**

Moskowitz, H. R.  
*Journal of Food Quality* 2 (3) 231-234 (1979) [En]  
[Developmetrics Inc., 60 Wilton Road, Westport, Connecticut 06880, USA]

## 76

**Classification of mouthfeel characteristics of beverages.** (In 'Food texture and rheology' [see FSTA (1980) 12 7A447]) [Lecture]

Szczesniak, A. S.  
pp. 1-20 (1979) [19 ref. En] [Corporate Res. Dep., General Foods Corp., White Plains, New York 10625, USA]

Preliminary work indicated that it is not possible to identify and classify the mouthfeel sensations of beverages via tasting sessions with trained panellists. Instead, a modified word association test was used to generate a large number of descriptive terms; these terms were generated from a questionnaire listing 33 beverages (including milk-based drinks, fruit juices,

alcoholic drinks, coffee, tea, chocolate, water and egg nog) and circulated to 103 people who were instructed to list terms describing how each beverage felt in the mouth. The total number of words generated/beverage ranged from 97 (canned fruit drink) to 219 (milk shake) with a mean of 150; the words most often used referred to the sensory perception of viscosity. Analysis of the results suggested that the terms generated could be grouped into 11 categories: viscosity-related (e.g. thin), feel on soft tissue surfaces (e.g. smooth), carbonation-related (e.g. bubbly), body-related (e.g. heavy), chemical effect (e.g. astringent), coating of oral cavity (e.g. clinging), resistance to tongue movement (e.g. slimy), mouth afterfeel (e.g. cleansing), physiological afterfeel (e.g. refreshing), temp.-related (cold or hot), and wetness-related (wet or dry). This classification serves as the basis for a discussion of the meaning of the different categories and for postulation of possible perceptual mechanisms. JA

## 77

**[Sensory training for panel members for the German Agricultural Society quality tests on meat products. I. Problems and aims.]** Sensorik-Ausbildung für Sachverständige der DLG-Qualitätsprüfung für Fleischerzeugnisse. I. Problemstellung und Ziele.  
Wirth, F.; Hauptmann, S.

*Fleischwirtschaft* 60 (1) 27-34; 96 (1980) [15 ref. De, en] [Bundesanstalt für Fleischforschung, 8650 Kulmbach, Federal Republic of Germany]

The training of panel members for quality evaluation of meat products is discussed, including sections on qualifying abilities (physical and psychological characteristics, education, sensory memory) and on practical exercises and tests, covering recognition of the 4 tastes (sweet, sour, salty, bitter), recognition of spice aromas, evaluation scales, and difference tests (triangular tests, ranking order). RM

## 78

**[Sensory training for panel members for the German Agricultural Society quality tests on meat products. II. Actual performance.]** Sensorik-Ausbildung für Sachverständige der DLG-Qualitätsprüfung für Fleischerzeugnisse. II. Praktische Durchführung.

Hammer, G. F.; Klettner, P.-G.; Tändler, K.; Stiebing, A.; Wirth, F.  
*Fleischwirtschaft* 60 (1) 34, 37, 42; 96 (1980) [6 ref. De, en] [Bundesanstalt für Fleischforschung, 8650 Kulmbach, Federal Republic of Germany]

## 79

**Evidence supporting a perceptual learning model of the sensory preconditioning of flavors.**

Freberg, L. A.  
*Dissertation Abstracts International*, B 40 (4) 1925:  
Order no. 79-21401, 87 pp. (1979) [En] [Univ. of California, Los Angeles, California 90024, USA]



## 80

[Study of aroma: physico-chemical and sensory methods.] [Review]

Adda, J.; Jounela Eriksson, P.

*Cahiers de Nutrition et de Dietetique* 14 (2) 115-129 (1979) [146 ref. Fr, en] [Lab. des Aromes - INRA Domaine de Vilvert 78350 Jouy-en-Josas, France]

Physico-chemical methods are reviewed in detail.

Mild methods of 1st extraction include: extraction of headspace gas above the product and gas chromatography of vapours from cryoconcentrated solutions using liquid N<sub>2</sub>; and entrainment of vapours by inert gas, condensed by cold or absorbed on polymers. These methods give poor yields and may miss minor components. More violent methods of steam extraction obtain more total volatiles, but with risk of decomposition; a new method of combined steam entrainment and solvent extraction (apparatus illustrated) plus refrigeration condensation gives good yields. Vacuum distillation plus liquid N<sub>2</sub> condensation avoids decomposition but varies in efficiency and recovery. Problems arise with large vol. of distillate containing low concn. of aroma compounds. Concn. of distillates by low temp. evaporation, sublimation, freeze concn. or extraction on polymers is discussed. Final extraction is influenced greatly by choice of solvent; dichloromethane is better than ethyl ether but Freon 114 or Freon 11 have been found to be the best. In the absence of a basic reference method, one should be chosen which agrees best with sensory evaluation of the particular food. Separation of compounds by preliminary fractionation of major groups, followed by gas chromatography and final MS identification is described. Problems of linking sensory properties with chromatographic peaks are described, including collection of fractions and presentation to a panel, interaction of numerous odours, perception of odour thresholds and concn., reproducibility, units of odour, aroma profiles and statistical examination to avoid personal variations. ELC

## 81

[Fruit juice extraction by the diffusion technique.]

Kardos, E.

*Konzerv-es Paprikaipar* No. 3, 98-104 (1979) [23 ref. Hu, de, ru] [Konzerv-es Paprikaipari Kutatointezet, Budapest, Hungary]

Analytical data showed that pressed apple juices contained 8-10 g/l more total sugar components, but less sugar-free extracts than diffusion juices. Thus, diffusion juices were less sweet than press juices. The polyphenol content of diffusion juices was 3× higher than that of pressed juices. The mineral content of diffusion juices was also higher. The content of aromatic substances and their composition were less favourable for diffusion juices than for press juices. In diffusion juices the concn. of esters and carbonyl compounds were 10-25% of those in press juices. However, the benzaldehyde content of diffusion juices was 40× higher than that of press juices. The aromatic properties and colouring (golden brown) of the pressed apple juice were scored higher (10 points) than those of the diffusion juice (8 points) by sensory analysis.

However, despite all the disadvantages of the diffusion technique, its higher juice yield (92-98%) may exert irresistible pressure on the fruit juice industry. ESK

## 82

Data analysis of sensory scores. Evaluations of panelists and wine score cards.

Kwan, W.-O.; Kowalski, B. R.

*Journal of Food Science* 45 (2) 213-216 (1980) [En] [Chem. Dep., Univ. of Washington, Seattle, Washington 97195, USA]

40 wines of *Vitis Vinifera* variety Pinot Noir from France and the USA were evaluated by a panel of 16 judges. A modified wine score card, which incorporated the Davis score card and quantitative descriptive analysis, was used. Principal component factor analysis was applied to the scores on a reference wine to determine the consistency of individual judges and uniformity among them. Data were also analysed by least-square multi-linear regression analysis to evaluate the modified score card. Comparisons of the modified score card and Davis score card are given. IFT

## 83

[Wine testing by a commission and forensic evidential value of its statement.] Kommissionelle Weinverkostung und forensische Beweiskraft ihrer Aussage.

Schneyder, J.

*Mitteilungen Klosterneuburg, Rebe und Wein, Obstbau und Fruchteverwertung* 27 (6) 262-264 (1977) [6 ref. De, en, fr] [Landw.-chem. Bundesversuchsanstalt; A-1020 Vienna, Trunnerstrasse 1, Austria]

In view of high court rulings in paternity cases accepting probability within the 3 s.d. range as determining, it is suggested that similar criteria be applied in panel judgements of wine quality or defects. Accuracy of sensory evaluation, and numbers of panel members required for a valid opinion are statistically discussed in this connection. SKK

## 84

[Preparation of clarified and concentrated juice from four apple varieties.]

Basaez Y., G.; Kiger M., F.; Galeb S., P.; Araya A., E.

*Investigacion Agricola* 3 (1) 33-37 (1977) [7 ref. Es, en] [Dep. de Produccion Agric., Univ. de Chile, Santiago, Chile]

Studies were conducted on the quality of clarified conc. apple juices made from various blends of the var. Granny Smith, Richared Delicious, Yellow Newton and White Winter. Data are given for the acidity, pH, soluble solids and vitamin C contents of juices of the 4 apple var., and of fresh and conc. clarified juices of 10 blends, (5 with and 5 without addition of vitamin C as an antioxidant), together with data for the organoleptic quality score and acceptability of juices stored for up to 8 months, and for juices conc. by a process with aroma recovery. A 50:50 Yellow Newton/White Winter blend received the highest acceptability score. The results show colour to be the major factor governing acceptability; it is therefore recommended that blended



juices should have a high content of Granny Smith juice (which has a low rate of browning) and a low level of Richared Delicious juice (which browns rapidly). Addition of 0.04% vitamin C as an antioxidant is advantageous. Intense illumination during storage should be avoided. AJDW

## 85

**The sensory and analytical evaluation of apple juice volatiles.** [Lecture]

Jepsen, O. M.

*Report, International Federation of Fruit Juice Producers, Scientific-Technical Commission* No. 15, 349-361 (1978) [28 ref. En, fr, de] [Food Tech. Lab., Tech. Univ. of Denmark, Denmark]

Sensory evaluations of apple juice were made by using a selected and trained taste panel consisting of 8-10 members from the laboratory. Qualitative and quantitative aroma analyses were performed using an adsorption technique on Tenax GC for isolation of the important volatiles in apple juice, which after heat desorption and condensation in a cold trap were transferred onto the gas chromatographic column by a gas sampling valve for separation and registration. The results of scores on aroma quality and intensity measured by the taste panel were negatively correlated to the content of ethyl acetate and positively correlated to the content of ethyl-2-methyl-butyrate, n-butanol, trans-2-hexenal and n-hexanol. These results were obtained from the analysis of 15 different commercial Danish apple juices and should be useful in routine quality assessments. [See FSTA (1980) 12 8H1208.] AS

## 86

**Flavour impact values: a new concept for assigning numerical values for the potency of individual flavour components and their contribution to the overall flavour profile.** [Lecture]

Casimir, D. J.; Whitfield, F. B.

*Report, International Federation of Fruit Juice Producers, Scientific-Technical Commission* No. 15, 325-347 (1978) [13 ref. En, fr, de] [Food Res. Lab., CSIRO Div. of Food Research, North Ryde, NSW 2113, Australia]

The juice of purple passionfruit (*Passiflora edulis* Sims) was used to illustrate a procedure for the selection and identification of flavour components contributing to the flavour profile of the juice. A new parameter, Flavour Impact Value (FIV), was determined for individual compounds important to the flavour profile by relating psychophysical flavour response of a sensory panel to an incremental increase in concn. of the compound. The FIV's of individual components and their concn. in the juice were used to determine the contribution of each component to the overall passionfruit flavour profile. Similarly the quality of the flavour profile can be determined for passionfruit juice concentrates, essence fractions and combinations of these. The validity of the procedure was supported by taste panel evaluations of a passionfruit drink made from a synthetic essence compounded to simulate the natural flavour profile. [See FSTA (1980) 12 8H1208.] AS

## 87

**Aroma analysis of fruits and fruit products: pitfalls and current problems.** [Lecture]

Williams, A. A.; Lewis, M. J.

*Report, International Federation of Fruit Juice Producers, Scientific-Technical Commission* No. 15, 183-211 (1978) [68 ref. En, fr, de] [Food & Beverages Div., Univ. of Bristol, Long Ashton Res. Sta., Long Ashton, Bristol, UK]

Various methods used for isolating aroma extracts from fruit and fruit products are reviewed, with particular reference to various distillation, extraction and headspace collection techniques, their limitations and causes of some differences in analytical results, e.g. the selective nature of the procedure itself, formation of artefacts due to enzymes, temp., pH, concn. changes, reaction with solvents, etc. Problems associated with the separation and identification of components in flavour extracts, the relationship between the instrumental results and sensory information perceived during eating, and some pitfalls in some of the techniques available for relating the results of chemical analysis to sensory responses and quality are described. [See FSTA (1980) 12 8H1208.] AL

## 88

**[Flavour evaluation of apricot nectar using sensory and gas chromatographic methods.]**

Aromabeurteilung von Aprikosennektar mit sensorischen und gaschromatographischen Methoden. [Lecture]

Sulc, D.; Juhas, E.; Vujcic, B.

*Report, International Federation of Fruit Juice Producers, Scientific-Technical Commission* No. 15, 173-182 (1978) [6 ref. De, en, fr] [Tech. Fac. der Univ., Novi Sad, Yugoslavia]

Flavour assessments of apricot nectars in Yugoslavia were made by sensory methods (organoleptic scoring system given) and from analyses by gas chromatography (technique given) with resulting aromagrams and the aroma concn. from planimetric areas. Results of organoleptic scores vs. analyses are tabulated and show very good correlation. Correlation coeff. (r) between analytical results and sensory evaluations were: general aroma 0.953, specific aroma note 0.917, agreement with national standard 0.815 and overall quality 0.854. A regression line is also given. Chromatographic flavour analysis cannot be applied if formation of undesirable secondary volatile components has occurred. [See FSTA (1980) 12 8H1208.] ELC

## 89

**Criteria for sensory evaluation of coffee beverage.** (In '8th International Scientific Colloquium on Coffee' [see FSTA (1980) 12 8H1257].) [Lecture]

Pangborn, R. M.

pp. 249-250 (1979) [4 ref. En, Fr] [Univ. of California, Davis, California, USA]

Analytical techniques were developed for visual and flavour characterization as well as for the measurement of sensory properties of drinking coffee. They are based



on the evaluation of the effect of water composition (distilled, soft and hard), method of extraction (open-pot, filter cone, automatic electric percolator and non-electric percolator), and of holding time and temp. Intercomparison of sensory methods, based on temporal characteristics, discrimination, perceived intensity, and degree of liking for sweetness in coffee beverages, were also applied. The techniques included the newly developed 'time-intensity' technique, where the strength of sweetness, bitterness, and coffee flavour were measured on a recorder chart with monitored time. This technique resulted in graphics of the temporal patterns of the initiation of the sensation, the duration and extinction point while the coffee was in the mouth, and after expectoration. ESK

## 90

**Flavor and texture of preserved intact sweet corn: comparison with cut sweet corn and storage tests.**

Robertson, G. H.; Guadagni, D. G.; Lazar, M. E. *Journal of Food Science* 45 (2) 221-223 (1980) [17 ref. En][USDA W. Reg. Res. Cent., SEA-AR, Berkeley, California 94710, USA]

Sensory studies were conducted to determine if intact or unit kernels of sweet corn (i.e. kernels which are detached at their normal abscission layer and lack a cut surface) can replace cut kernels. Samples of intact or unit kernel sweet corn were compared hedonically and by relative preference with samples of cut sweet corn after appropriate processing. Stability of the frozen and canned intact kernels was studied for 1 yr. Hedonic ratings for frozen intact corn yielded values of 7.4-7.6 [1 = dislike, 9 = like] compared to values of 6.0-6.2 for cut corn. Hedonic ratings for canned intact corn yielded values of 6.4-6.8 compared to values of 5.9-6.1 for cut corn. Laboratory taste panels expressed preference for intact samples in 86-89% of the judgements of frozen corn and in 64-86% of the judgements of canned corn. Both flavour and texture of the intact corn were most frequently cited as the reasons for preference. Frozen samples of intact kernels were stable for at least 1 yr at -18°C. Canned samples of intact kernels of Golden Jubilee and Golden Happiness were stable for 1 yr at 18°C. Sensory differences were detected in Stylepak samples at the 12-month evaluation. IFT

## 91

**Modified copper soap solvent extraction method for measuring free fatty acids in milk.**

Shipe, W. F.; Senyk, G. F.; Fountain, K. B. *Journal of Dairy Science* 63 (2) 193-198 (1980) [6 ref. En][Dep. of Food Sci., Cornell Univ., Ithaca, New York 14853, USA]

The copper soap method (CSM) [see FSTA (1977) 9 9P1423] for measuring free fatty acids (FFA) in milk was modified by adding the copper reagent, together with the solvent, to the acidified milk sample (without addition of EDTA). The relationship between modified CSM and Bureau of Dairy Industry Method (BDI) [American Milk Review (1955) 17, 50-52] results for 124 non-homogenized and 109 homogenized milk samples was examined and correlation coeff. of 0.90 and 0.88, resp., were found. The BDI method gave higher values than CSM for the FFA content of homogenized milk.

The FFA in homogenized milk appear to be bound in a form that is not readily extracted by the solvent used in the CSM. Relationships between flavour evaluations by a taste panel and chemical analyses for FFA in non-homogenized and homogenized milks are discussed. The flavour threshold for FFA in homogenized milk was slightly higher than that in non-homogenized milk. MEG

## 92

**[Texture - a sensory quality complex. II.] Textur - ein sensorischer Qualitätskomplex. II.**

Tilgner, D. J.

*Fleischwirtschaft* 59 (8) 1094, 1096-1102; 1153 (1979) [50 ref. De, en][Ulica Abrahamia 1m, 3a, 81-825 Sopot, Poland]

Sensory and instrumental methods of texture analysis are reviewed. The physiology of chewing is discussed, including quantitative evaluation of chewiness (chew count and pressure). Taking as an example the texture profile analysis (TPA) [see FSTA (1975) 7 8A423] of Frankfurter-type sausages, it is shown that many textural properties can be evaluated by a trained analyst. The instruments used for texture detn. are briefly discussed. On the whole, the complex sensory quality of meat texture can be most successfully elucidated by trained tasting panels. [See FSTA (1980) 12 3S409 for part I.] RM

## 93

**Notes on consumer oriented sensory evaluation.**

Moskowitz, H. R.; Chandler, J.

*Journal of Food Quality* 2 (4) 269-276 (1979) [En][MPi Sensory Testing Inc., 770 Lexington Avenue, New York, New York 10021, USA]

## 94

**The influence of temperature on the threshold values of primary tastes.**

Paulus, K.; Reisch, A. M.

*Chemical Senses* 5 (1) 11-21 (1980) [10 ref. En] [Federal Res. Cent. for Nutr., D-75 Karlsruhe, Federal Republic of Germany]

The threshold values of taste substances are influenced by several factors. To learn about the effect of the temp. on stimulus, recognition and terminal thresholds, these threshold values were determined for sucrose, sodium chloride, caffeine, quinine hydrochloride, citric and tartaric acid at temp. of 10°, 20°, 40° and 60°C in a panel of 19 tasters. The individual values were found to vary over a wide range, resulting in a relatively large s.d. of the mean threshold values. A temp. dependence was found for the stimulus and recognition thresholds which was different for the different taste substances. The stimulus and recognition thresholds are lowest in the temp. range of 20° to 40°C. The threshold values increase with increasing temp., and except for citric acid, significant and highly significant differences existed particularly between 20° and 60°C, whereas statistically verifiable results could not be obtained between 10° and 20°C. There was no verifiable temp. dependence either for the terminal thresholds. The terminal thresholds were found to lie rather in a relatively narrow concn. range and to be



largely independent of the temp. The results suggest that in warm dishes and beverages more taste substances are required to produce the same taste intensity. A dependence of the individual thresholds upon age, sex and smoking habits could not be found. AS

## 95

**Influence of roasting time on sensory attributes of fresh roasted peanuts.**

Buckholz, L. L., Jr.; Daun, H.; Stier, E.; Trout, R. *Journal of Food Science* 45 (3) 547-554 (1980) [En] [International Flavors & Fragrances, 1515 Highway 36, Union Beach, New Jersey 07735, USA]

2 var. of peanuts, Runner No. 1 and Spanish, were roasted at 163°C for 7, 8, and 9 min to produce light, medium, and dark roast samples. Sensory evaluation was conducted with a trained panel using a 9-point hedonic scale to rate strength and desirability of odour and flavour. An analysis of variance performed on panel scores produced an s.d. of 1.81. Statistically significant differences were found among var. and roasting conditions. Volatile components were collected on Tenax GC followed by characterization and quantitation by gas chromatography (GC). Statistical analysis was used to correlate sensory and instrumental analysis. Stepwise regression showed good correlation between sensory properties and selected GC peaks. The coeff. of detn. for the selected peaks averaged 0.9580. Prediction of strength and flavour quality will be possible using a developed equation. IFT

## 96

**[Making sensory analysis of apples objective.] Beitrag zur Objektivierung der sensorischen Prüfung beim Apfel.**

Zanon, K. *Gartenbauwissenschaft* 43 (6) 260-270 (1978) [29 ref. De, en, fr, ru] [Versuchszentrum für Land & Forstwirtschaft, Laimburg, S. Tyrol, Italy]

Studies were commenced in 1971 at the Laimburg Experimental Station, with a view to perfecting an objective system of organoleptic assessment for apples. This report outlines the system as finally proposed in 1978, based on a scoring system for 3 principal characters, viz. external appearance, taste and consistency, and extending where necessary to others such as internal appearance, aroma, skin texture and juiciness etc. A 9-point scale is used for each attribute, divided into 3 ranges. The application of the scoring system is illustrated with reference to panel tests employing 13 judges to assess the quality of the principal apple var. grown in the South Tyrol; the reproducibility during repeat testing was very good. Various possible applications of the new scoring system in research and field studies are considered. BDH

## 97

**Quality of bread fortified with ten micronutrients.**

Emodi, A. S.; Scialpi, L. *Cereal Chemistry* 57 (1) 1-3 (1980) [7 ref. En] [Development Dep., Hoffman-La Roche Inc., Nutley, New Jersey 07110, UK]

The quality of bread fortified with the vitamin and mineral supplements suggested by the Food and Nutrition Board of the National Academy of Sciences/National Research Council was studied. Bread was fortified with the full vitamin and mineral supplement. Micronutrient stability during baking and storage was excellent. No off-flavour was noticed by 10 trained taste panelists in bread stored for 5 days at room temp. or for 4 wk at freezer temp. AS

## 98

**Quality indices in chilled trout: comparison of K-values, conventional quality indices and values obtained by a taste panel. [Lecture]**

Tejada, M.; Moral, A.; Borderias, A. J. *Bulletin de l'Institut International du Froid* 59 (4) 1168-1169 Abstr. C2-79 (1979) [En, Fr] [Inst. del Frio, Madrid 3, Spain]

As most trout is marketed in the chilled condition in Spain it is necessary to develop objective, simple and rapid techniques to control quality. The first step was the conventional detn. of pH, total basic volatile N, hypoxanthine and viable microorganisms count, in order to determine the start of product deterioration. Batches of whole trout and vacuum-packed eviscerated trout were chill-stored and as quality indices a comparison was made of K-values, conventional quality indices and taste panel results by establishing a correlation between the most significant indices. [See FSTA (1980) 12 9G615.] AL

## 99

**Effects on quality attributes of holding rock lobsters in slush ice before tailing.**

Bremner, H. A.; Veith, G. *Journal of Food Science* 45 (3) 657-660 (1980) [En] [CSIRO Div. of Food Res., Tasmanian Food Res. Unit, "Stowell", Stowell Avenue, Hobart, Australia 7000]

Taste panel evaluation, yield measurements and analytical tests were carried out on the frozen stored (-18°C) tail flesh from southern rock lobsters (*Jasus novaehollandiae* Holthius) which had been tailed while live (no holding period in slush ice) or after being held in slush ice (0°C) for periods of 1, 18 or 48 h before being tailed. The taste panel results did not reveal any differences in the organoleptic quality of frozen lobster flesh subjected to various holding periods in slush ice or with subsequent frozen storage at -18°C for up to 40 wk. Holding lobsters in slush ice for 48 h resulted in lower yield of cooked tail flesh, whereas holding for 18 h did not affect the yield of cooked tail flesh or its edible quality. IFT

## 100

**Optimum cooking times for flavor development and evaluation of flavor quality of beef cooked by microwaves and conventional methods.**

Bodrero, K. O.; Pearson, A. M.; Magee, W. T. *Journal of Food Science* 45 (3) 613-616 (1980) [En] [Dep. of Food Sci. & Human Nutr. & Anim. Husbandry, Michigan State Univ., East Lansing, Michigan 48824, USA]

Beef *longissimus dorsi* roasts weighing 200 g, and



cooked by microwaves or conventional methods for various times were evaluated for flavour and overall acceptability by an untrained panel. Analysis of the data by surface response methodology was utilized to ascertain optimum cooking times for flavour development. The optimum cooking time for conventionally roasted (electric oven at 177°C) meat was predicted to be 88 min as compared to 2.80 min for samples cooked by microwaves (2450 MHz). Samples cooked by conventional roasting generally received higher scores for acceptability and flavour than those cooked by microwaves. Flavour dilution profiles for aqueous extracts of the samples revealed that the conventionally cooked samples were rated slightly stronger in flavour, more pleasant and more meaty than samples cooked by microwaves. IFT

## 101

**Sensory screening of synthetic sweeteners using time-intensity evaluations.**

Swartz, M.

*Journal of Food Science* 45 (3) 577-581 (1980) [En]  
[Beatrice Foods Res. Cent., 1526 S. State Street,  
Chicago, Illinois 60605, USA]

To evaluate aftertaste (AT) in sweeteners, time-intensity (TI) sensory studies were conducted using individuals who recorded intensity of AT as time passed on a strip chart recorder. The panelists were first trained to consistently evaluate TI properties for common sweeteners such as sucrose and saccharin. The trained panel gave reproducible results on equal solutions, differentiated between various concn. of the same substance, and generated different TI curves for compounds which are known to vary in their taste onset and lingering AT. A selected panel was employed to evaluate the properties for certain newly synthesized sweeteners. IFT

## 102

**Sensory analysis. Determination of sensitivity of taste.**

International Organization for Standardization  
*International Standard* ISO 3972:1979, 5pp. (1979)

[En]

A set of objective tests is described for determining sensitivity of taste in regard to the 4 primary tastes (acid, bitter, salty, sweet). It consists of (i) detn. of ability to recognize the primary tastes, and (ii) detn. of 3 different types of threshold, i.e. detection, recognition and difference thresholds. 2 series of dilutions of test solutions, geometric and arithmetic, are used for detn. of (ii). The standard is intended to allow measurement of the sensitivity of taste of assessors, and may be applicable as a periodic monitor of this taste-sensitivity. AL

## 103

**Rupture tests vs. small-strain tests in predicting consumer response to texture.** [Lecture]

Bourne, M. C.

*Food Technology* 33 (10) 67-70 (1979) [23 ref. En]  
[New York State Agric. Exp. Sta. & Inst. of Food Sci.,  
Cornell Univ., Geneva, New York 14456, USA]

In order to predict consumer response to food texture via objective rheological tests, it is first necessary to correlate the results of sensory evaluation with the results of objective tests. To achieve such a correlation, sensory evaluation must be conducted by panelists trained to describe the textural properties being studied and the objective tests must be conducted under optimum testing conditions. In addition, as is discussed in this paper, the type of objective test used must match the type of sensory method used; the paper confines itself to those objective tests in which there is unrestrained uniaxial compression on solid foods. Definitions are included of the following terms used in the paper: rupture, stress, strain, small strain (or small compression). The author then discusses the correlation between objective and sensory texture tests, consideration being given to both rupture tests and small-compression (or small-strain) tests. Correlations found between objective and sensory tests with various specific foods are considered. Mention is also made of the system of Texture Profile Analysis, which successfully correlates objective rupture tests with sensory assessment. The author concludes that both rupture and small-compression tests have a role to play in correlating instrumental measurements with sensory testing but that, in view of the fact that most textural parameters of foods are sensed in the mouth, rupture tests will continue to be the predominant type of successful test. [See FSTA (1980) 12 10A689.] JA

## 104

**Determining relationships among objective, expert, and consumer measures of texture.** [Lecture]

Moskowitz, H. R.; Kapsalis, J. G.; Cardello, A. V.;  
Fishken, D.; Maller, O.; Segars, R. A.

*Food Technology* 33 (10) 84-88 (1979) [8 ref. En]  
[Developmetrics Inc., Div. of Weston Group Inc., 60  
Wilton Road, Westport, Connecticut 06880, USA]

Using rye bread, studies were conducted to determine the inter-relationships among levels of ingredients, rheological properties and sensory/hedonic measurements. 12 rye breads containing different levels of rye flour (12, 19.5, 27 and 42%) and sucrose (0, 3 and 6%) were evaluated. An Instron Universal Testing Machine was used to measure rheological properties (modulus of elasticity, hysteresis loss, strain energy, stress); density and % water were also determined. The breads were also evaluated by a trained taste panel and by a consumer panel. The information generated by these studies was used to determine the following relationships: rheological measurements vs. ingredient levels; panel ratings of textural attributes (density, firmness, cohesiveness, ease of surface removal, chewiness, adhesive/stickiness, surface roughness, moistness, cohesive-chewiness, graininess) vs. ingredient levels; rheological measurements vs. panel ratings of textural attributes; panel ratings of liking vs. ingredient levels and rheological measurements. Consideration is then given to the ways in which such inter-relationships can be used in predicting and matching texture profiles and in predicting consumer response in product development work. [See FSTA (1980) 12 10A689.] JA



105

**Taste perception in young children.**

Thomas, M. A.; Murray, F. S.  
*Food Technology* 34 (3) 38-41 (1980) [4 ref. En] [Dep. of Psychology, Randolph-Macon Woman's Coll., Lynchburg, Virginia 24503, USA]

The aims of this study were to provide more information on the taste perception of young children and to develop a rapid and valid procedure for studying developmental differences in taste perception. The children used in the study were selected from a group of 60 aged 5-8 yr; an adult group (4 female undergraduates) was used for comparison. The samples used in the sensory evaluation procedures were 0.1, 1, 10, 20 and 40% solutions of 8 herbs or spices (anise, cinnamon, cloves, ginger, marjoram, nutmeg, oregano, sage). Details are included of the procedures used in choosing and screening the panelists, in preparation of the spice solutions, and in sensory evaluation. The sensory evaluation procedures consisted of 2 sessions. The first required the children to compare the spice solutions to distilled water, 'same-different' judgments being made for these comparisons. The results were used to establish comparative levels of intensity for 5 (excluding anise, cloves and ginger) of the spice solutions; the second session consisted of pair comparisons of these solutions. Evidence provided by the results suggests that no significant difference exists in the abilities of taste discrimination of spices between children aged 5-8 or between children and adults. It was also found that the procedures employed are effective and reliable techniques for studying taste perception in young children. JA

106

**[Problems with evaluation of natural flavours.]**

Probleme bei der Beurteilung von natürlichen Aromen.  
 [Review].  
 Tressl, R.

*Lebensmittelchemie und Gerichtliche Chemie* 34 (2) 47-53 (1980) [27 ref. De] [Lehrstuhl für Chem.-tech. Analyse, Tech. Univ. Berlin, 1000 Berlin 65]

Aspects discussed include: 'impact components' in the flavour and aroma of foods; developments in flavour and aroma research (extraction and concn. of aroma compounds, GLC analysis, characterization of individual compounds by MS, NMR and IR spectroscopy); biosynthesis of impact components (with special reference to raspberry flavour constituents); problems with flavour evaluation in foods which lack 'impact components'; formation of C6 and C9 components by enzymic-oxidative processes; and thermal reactions in aroma formation (e.g. in roasting of coffee). AJDW

107

**Vinification of three white grape varieties by three different methods. II. Sensory evaluation of the wines.**

Buteau, C.; Duitschaeffer, C. L.; Ashton, G. C.  
*American Journal of Enology and Viticulture* 30 (2) 146-151 (1979) [4 ref. En] [Dep. of Food Sci., Univ. of Guelph, Guelph, Ontario, Canada N1G 2W1]

3 types of grapes: Niagara, Riesling and Verdelet grown in the Niagara Peninsula (Canada), were vinified by 3 different methods, a traditional Canadian method, and the German method of winemaking with and without the addition of juice reserve to the finished wine. After storage of one month in the bottle, the wine was evaluated by a taste panel of seven experienced wine tasters and 21 untrained consumers. The statistical analysis consisted of a partially balanced lattice design. The scorecard was of the interval scale type. In general, wines made by the German method were preferred over wines made by the Canadian method and wines to which juice reserve was added were considered well-balanced and most acceptable by both the consumer and the expert panel. [See preceding abstr. for part I] AS

108

**Beer flavor terminology.**

Meilgaard, M. C.; Dalglish, C. E.; Clapperton, J. F.  
*Journal of the American Society of Brewing Chemists* 37 (1) 47-52 (1979) [9 ref. En] [Stroh Brewery Co., Detroit, Michigan 48226, USA]

See FSTA (1979) 11 9H1359.

109

**[Beer flavour terminology.]**

Meilgaard, M. C.; Dalglish, C. E.; Clapperton, J. F.  
*Bios* 10 (2) 23-31 (1979) [9 ref. Fr, en, de] [Stroh Brewery Co., Detroit, Michigan 48226, USA]

See FSTA (1979) 11 9H1359 for original En version.

110

**Evaluation of density separation for defining fruit maturities and maturation rates of once-over harvested muscadine grapes.**

Lanier, M. R.; Morris, J. R.

*Journal of the American Society for Horticultural Science* 104 (2) 249-252 (1979) [18 ref. En] [Univ. of Arkansas, Dep. of Hort. Food Sci., Fayetteville, Arkansas 72701, USA]

'Carlos' muscadine grapes (*Vitis rotundifolia* Michx.) were sorted into 5 density grades using 4 brine solutions of 8, 9, 10 and 11% NaCl. Soluble solids and berry wt. increased, colour improved, and acidity decreased with grape maturity and brine concn. Panelist's sensory preference increased with increasing density (maturity). Berries that floated and sank in 11% NaCl (density grades 4 and 5) had acceptable ratings for flavour, aroma, and colour. Density separation was used to monitor the rates of maturation of the cv. 'Carlos' and 'Noble'. The technique was useful in characterizing the changes in berry population during the last month of ripening. AS

111

[Variety and sensory trials of green and yellow dwarf beans.] Sortenversuch mit grünen und gelben Buschbohnen mit anschließender sensorischer Prüfung.  
 Lindner, V.

*Industrielle Obst- und Gemüseverwertung* 64 (6) 151-155 (1979) [De] [Versuchsanstalt für Obst- & Gemüsebau der Landwirtschaftskammer Rheinland,



Köln-Anweiler, Federal Republic of Germany]

50 green and yellow bean var. were used in var. trials designed to combine max. yields with best quality. 38 var. were used for sensory tests on industrially preserved (bottled) beans. Sensory properties evaluated by panel tests were colour, shape, consistency, flavour and stringiness. Tabulated results showed that green var. Filetty and Lit, yellow var. Gabriella and Goldfisch had the best combination. RM

## 112

**Sensory aspects of UHT milk combined with whole pasteurized milk.**

Horner, S. A.; Wallen, S. E.; Caporaso, F. *Journal of Food Protection* 43 (1) 54-57 (1980) [17 ref. En] [Dep. of Food Sci. & Tech., Univ. of Nebraska, Lincoln, Nebraska 68583, USA]

This study evaluated sensory quality of mixtures of whole pasteurized milk (WPM) with 0-75% indirectly heated UHT processed milk. 30 experienced panelists were used to make multiple comparison tests between samples. 75-87.5% of the panelists were able to distinguish differences between samples of UHT milk and WPM in multiple comparison tests. About 86% of 58 consumer panelists were neutral toward or liked WPM, whereas only 56% of the consumer panelists were neutral toward or liked mixtures containing 75% UHT milk. These studies show that people can accurately identify UHT milk and that they prefer WPM to indirectly heated UHT milk. AS

## 113

**The importance and application of sensory investigations.]** Bedeutung und Anwendung sensorischer Untersuchungen.

Wirth, F.

*Fleischerei* 31 (4) 274-276 (1980) [De] [Bundesanstalt für Fleischforschung, D-8650 Kulmbach, Federal Republic of Germany]

Sensory evaluation of meat products is briefly discussed with reference to: the importance of organoleptic properties for the quality of food; sensory acuity and discrimination capabilities of test personnel; training of test personnel; test methods and conditions; and practical aspects of conduct of sensory tests on meat products. AJDW

## 114

**[Introduction to methods in sensory analysis.]** Einführung in die Methoden der sensorischen Untersuchungen.

Hammer, G. F.

*Fleischerei* 31 (4) 276, 279-280, 282 (1980) [23 ref. De] [Bundesanstalt für Fleischforschung, D-8650 Kulmbach, Federal Republic of Germany]

Basic principles of sensory analysis methods suitable for use in the meat industry are discussed, with reference to: selection and training of test personnel, detection-, identification-, saturation- and discrimination threshold values for organoleptic characteristics; sensory analysis of individual samples; testing for differences between 2 or more samples (duo-test, duo-

trio test, triangle test, ranking tests); descriptive tests, profile and dilution profile tests; and qualitative evaluation using a scale. AJDW

## 115

**[Practical aspects of conduct of sensory analysis.]**

Durchführung organoleptischer und sensorischer Untersuchungen in der Praxis.

Tändler, K.

*Fleischerei* 31 (4) 292, 295-296, 298, 300, 385-387 (1980) [19 ref. De] [Bundesanstalt für Fleischforschung, D-8650 Kulmbach, Federal Republic of Germany]

Sensory analysis of meat and meat products is discussed, with reference to: applications of sensory analysis; problems and errors in sensory analysis; maximization of objectivity of sensory analysis; selection and training of personnel for sensory analysis panels; test conditions; reporting of sensory analysis results, and applications of sensory analysis in the meat industry (quality control, evaluation of competing products, development of new recipes and processing methods, checking of new additives, seasonings and equipment, and evaluations of the keeping quality of products). AJDW

## 116

**Effects of serving temperature on sensory evaluation of beef steaks from different muscles and carcass maturities.**

Olson, D. G.; Caporaso, F.; Mandigo, R. W.

*Journal of Food Science* 45 (3) 627-628, 631 (1980) [En] [Dep. of Anim. Sci., Univ. of Nebraska, Lincoln, Nebraska 68583, USA]

Effects of post-cooking beef sample temp. of 22°C (room temp.) and 50°C on sensory measures were determined. Steaks from *psaos*, *longissimus*, and *semitendinosus* muscles from carcasses of A-, A+, and C+ USDA maturity groups were used. Steaks were oven roasted to 70°C internal temp. and cores (1.88 cm) were removed and halved, with one-half being maintained at 22°C and the other half at 50°C. A calibrated double boiler system was used to accurately control sample temp. 8 trained sensory panelists rated all samples on a 7-point rating scale for flavour, juiciness, initial tenderness, and overall tenderness, and on a 5-point rating scale for connective tissue residue. Significantly higher values for flavour ( $P < 0.01$ ) and juiciness ( $P < 0.01$ ) were found for 50°C samples. Tenderness measures were not affected by serving temp. Correlation coeff. between juiciness and the various tenderness measures were higher for the 22°C samples but lower for flavour and the other sensory measures at 22°C. IFT

## 117

**[Statistical evaluation of results of sensory studies.]**

Statistische Auswertung sensorischer Untersuchungen. Stiebing, A.

*Fleischerei* 31 (4) 284-285, 288, 290 (1980) [2 ref. De] [Bundesanstalt für Fleischforschung, D-8650 Kulmbach, Federal Republic of Germany]

Statistical analysis of the results of sensory tests is



briefly discussed, with reference to: the aims of statistical evaluation; basic principles of statistics (normal distribution, s.d., estimation of statistical significance of data); and application of statistical analysis to paired discrimination tests, triangle tests and detn. of mean values. AJDW

## 118

**Report of the technical subcommittee on sensory analysis.** [Lecture]

Meilgaard, M. C. (Chairman)

*Journal of the American Society of Brewing Chemists* 37 (3) 130-131 (1979) [3 ref. En]

A list is presented, giving details of the first 17 compounds which are recommended for adoption as international flavour reference standards, including difference thresholds at typical (specified) levels in beer. [See FSTA (1979) 11 9H1359 and FSTA (1980) 12 11H1586.] JRR

## 119

**[Recent advances in the research on tastes and odours of fats and oils.]** [Review]

Usuki, R.; Kaneda, T.

*Journal of Japan Oil Chemists' Society [Yukagaku]* 28 (10) 717-723 (1979) [53 ref. Ja] [Fac. of Agric., Tohoku Univ., Sendai, Japan]

## 120

**The use of taste panels in evaluating the maturity of NSW avocados.**

Lewis, C. E.; Dettmann, E. B.; Battye, W.

*Food Technology in Australia* 31 (9) 394-396 (1979) [8 ref. En] [Agric. Res. Cent., NSW Dep. of Agric., Wollongbar, NSW 2480, Australia]

To overcome the problem of immature fruit i.e. which look like mature fruits but after ripening are watery, tasteless and inedible, being marketed early in the season, the Avocado Growers Association has pressed for the detn. and introduction of maturity standards. Taste panels were selected and trained to evaluate the acceptability of avocados, and the main sources of variation affecting taste panel estimates of acceptability were determined. Cv. Rincon, Fuerte, Sharwil, Zutano and Hass were ripened at 25°C until soft. Average min. acceptable values for the qualities judged by the panel were 4.8 for colour, 5.3 for texture, 5.8 for flavour, and 5.7 for acceptability. Consideration of the hedonic scale and the range of preferred minima suggests that a min. level of acceptability would be in the range 4-6, and probably the mid-point 5.0 would be most suitable. Flavour was the most important factor in acceptability, texture next and colour least. Early in the season acceptability levels increased with time and also varied somewhat among tasters and among fruit. Individual tasters did not score consistently and there were large differences between samples of one fruit. As the season progresses the major variability was the variation within a fruit. VJG

## 121

**[Processing and stability of fried soybeans.]**

Carvalho, R.; Cabral, A. C. D.; Ferreira, V. L. P.;

Shirose, I.

*Boletim do Instituto de Tecnologia de Alimentos, Brazil* 16 (1) 99-115 (1979) [6 ref. Pt, en] [Inst. de Tecnologia de Alimentos (ITAL), Campinas, Sao Paulo, Brazil]

Manufacture of fried soybeans by 2 processes is described, based on (i) soaking followed by frying or (ii) boiling followed by frying. The fried samples were stored for 90 days in sealed cans (the internal atm comprising air or N<sub>2</sub>) or in polypropylene bags (exposed to light or not exposed), at 23°C/65% RH or 38°C/90% RH. Data are given for the fat content of the fried products, organoleptic properties, and moisture content, peroxide value and Kreis reaction of the stored samples. Taste panellists preferred samples made by method (i), which had better taste and appearance than those made by method (ii). With both processes, fat absorption tended to increase with increasing frying temp. Samples stored at 23°C/65% RH remained acceptable for 90 days, independent of the packaging method. Products packaged in polypropylene sachets, or canned in air, were unacceptable after storage for 60 days at 38°C/90% RH. AJDW

## 122

**[Diacetyl content and organoleptic evaluation of ripened cream butter.]**

Rusev, Kh.

*Veterinarnomeditsinski Nauki* 16 (4) 7-11 (1979) [Bg, ru, en] [Tsentralen Nauchnoizsled. Vet. Med. Inst., Sofia, Bulgaria]

A panel of 11 men and 15 women assessed 120 samples of ripened cream butter on taste, smell and aroma. 53 samples received 39-45 points and were adjudged of 1st quality; 17 of them contained diacetyl at <0.1 mg/kg, 32 contained 0.1-0.5 mg/kg, and 4 contained >0.5 mg/kg. 67 samples received 46-50 points and were adjudged of extra quality; 9 of them contained <0.1 mg/kg, 38 contained 0.1-0.5 mg/kg, and 20 contained >0.5 mg/kg. Of 49 samples containing >0.25 mg/kg, 82% were classified as of extra quality vs. 18% classified as of 1st quality; on the other hand, 65% of 26 samples containing <0.1 mg/kg were classified as of 1st quality vs. 35% classified as of extra quality. SKK

## 123

**Cocoa substitutes: can they match the flavor?**

Kenyon, J. P.; Lindamood, J. B.; Kristoffersen, T.

*American Dairy Review* 42 (5) 22, 24 (1980) [En] [Ohio State Univ., 190 North Oval Drive, Columbus, Ohio 43210, USA]

The effect of cocoa substitutes on the flavour and other characteristics of chocolate-flavoured milk was evaluated with 6 commercial products, including carob, added to whole milk as 30, 50 or with some as 100% replacement for cocoa. The sugar levels were adjusted for some of the samples to comply with the manufacturer's recommendations and the milks were pasteurized at 180°F for 25 s and homogenized at



1500 lb/in<sup>2</sup>. A commercial cocoa product was used for the preparation of control samples and as the balance of flavouring in the experimental samples. In flavour evaluation by an untrained 18-member panel, the acceptance of chocolate milk flavoured with the various substitutes varied according to the substitute brand and its level of use. Generally, the acceptance of the chocolate milk decreased as the level of the substitute product was increased, but nevertheless 3 brands, at 30–50% levels, are considered as potentially acceptable for use by the dairy industry. With 2 exceptions a heavy sediment resulted during storage of the experimental samples containing substitutes at 50 or 100% levels. FL

## 124

**Bacteriological evaluation of fresh and aged market milk.** [Lecture]

Ledford, R. A.; Senyk, G. F.; Shipe, W. F.; Bandler, D. K.; Wolff, E. T.

*Journal of Dairy Science* 63 (suppl. 1) 43 (1980) [En] [Cornell Univ., Ithaca, New York 14850, USA]

24 fresh (<43 h) and 24 aged (held until 'sell by' date) pasteurized milk samples resp. had log standard plate counts (SPC) of 3.29 and 7.13, and log psychrotrophic counts of 1.61 and 6.63. Log SPC limit of 4.3 for Grade A pasteurized milk was exceeded in 2 fresh and 21 aged samples; even when stored at 4.4°C, 18 of 22 samples had log SPC of >4.3 by the 'sell by' date. Correlation of log SPC with flavour score was -0.80 when evaluated by a trained panel. [See FSTA (1980) 12 12P1953.] CDP

## 125

**Flavor and chemical evaluations of fresh and aged market milk.** [Lecture]

Shipe, W. F.; Senyk, G. F.; Ledford, R. A.; Bandler, D. K.; Wolff, E. T.

*Journal of Dairy Science* 63 (suppl. 1) 43 (1980) [En] [Cornell Univ., Ithaca, New York 14850, USA]

A 50-member consumer taste panel and an 8-member trained panel evaluated 24 fresh pasteurized milk samples (obtained within 43 h of processing) and 24 aged samples (held until the sell-by date). A highly significant correlation of 0.94 was found between the 2 panels for all samples. The consumer panel disliked 3 fresh and 13 aged samples. The trained panel described the off-flavour of the 3 fresh samples as oxidized or burnt, and that of 12 of the 13 aged samples as fruity-fermented and/or rancid. The 13 disliked aged samples had a mean acid degree value of 1.3, tyrosine value of 66 mg/l and pyruvate content of 24 mg/l. Corresponding values for 11 acceptable aged samples were 1.3, 47 and 12 mg/l; and for 24 fresh samples they were 0.9, 38 and 6 mg/l. [See FSTA (1980) 12 12P1953.] MEG

## 126

**Effects of fat level and source on the chemical, sensory, and cooking properties of ground beef patties.**

Cross, H. R.; Berry, B. W.; Wells, L. H.

*Journal of Food Science* 45 (4) 791–793 (1980) [En] [USDA Meat Sci. Res. Lab., SEA-AR, Beltsville Agric.

Res. Cent., Beltsville, Maryland 20705, USA]

Ground beef patties were prepared from varying fat sources to final raw fat contents of 16, 20, 24, and 28%. Trained sensory panelists evaluated each treatment for differences in tenderness, juiciness, connective tissue amount, mouth coating effect, and ground beef flavour intensity. Other patty characteristics examined included raw and cooked fat and moisture, cooking losses, Instron shear force and total and % of soluble collagen. Generally, increasing fat levels in formulations resulted in higher tenderness and juiciness scores and ratings indicative of lower connective tissue amount. Neither collagen content nor total cooking loss was significantly affected by fat level. Sensory ratings and cooking properties were not significantly affected by fat source. IFT

## 127

**Quality differences in simulated kosher and conventionally processed chicken.**

Powers, J. M.; Mast, M. G.

*Journal of Food Science* 45 (4) 760–764 (1980) [En] [Pennsylvania State Univ., University Park, Pennsylvania 16802, USA]

Under simulated commercial conditions, the quality of kosher and conventionally processed chickens was compared. 3 processing differences occurring with kosher chickens were studied: cold water 'scald', longer mechanical picking time, and 'koshering' (salting) following evisceration. A factorial experiment (2 × 2 × 2), with 2 variations of scalding, picking and salting was conducted. Kosher chickens absorbed more water during water chilling than did conventionally processed birds. Colour values reflected loss of the yellow epidermal layer for hot-scalded treatments. Shear values for fresh refrigerated birds were approx. the same for kosher and conventionally processed chickens. Lipid oxidation was accelerated on salted skin samples during frozen storage, but not on frozen salted meat samples. Salting decreased the total aerobic plate count; however, kosher and conventional treatments had approx. the same number of coliforms. Skin and meat from carcasses exposed to salt contained significantly more Na than carcasses not exposed to salt. A taste panel preferred meat from salted birds throughout storage. Higher levels of lipid oxidation were detected by the taste panel on salted skin samples after 8 months frozen storage but not at 2 months' frozen storage. IFT

## 128

**Boars for bacon – the present position.**

Joseph, R. L.

*Farm and Food Research* 9 (5) 115–117 (1978) [En]

A panel of trained judges was used to examine taint levels in boars, hogs and gilts. Belly fat samples were taken the day after slaughter, frozen and presented after about 10 days to the panel in batches of 6, independent of sex. The soldering iron technique was used and judges were invited to score on a 6-point scale. The scores for all 6 judges were summed to get a scale of 0–30. Hogs and gilts showed some 'taint' which was actually just 'piggy' odours that arise inevitably. The mean score for boars was significantly different from that for the other 2 types, which do not differ

significantly from each other. The results show that about 2% of boars have taint in excess of the highest scoring hog. The cut-off point between tainted and non-tainted is a matter of definition. Consumer test results on boar bacon and pork in N. Ireland and Britain are favourable to the use of boars; on the Continent the verdict is not so decisive. VJG



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FAB 15

TASTE PANELS IN FOOD SCIENCE

SELECTED FROM VOLUME **13**

FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

under the direction of:-

Commonwealth Agricultural Bureaux, Farnham Royal, Slough; Gesellschaft für Information und Dokumentation, Frankfurt am Main; Institute of Food Technologists, Chicago; Centrum voor Landbouwpublikaties en Landbouwdocumentatie (Pudoc), Wageningen.





## INTRODUCTION

Food Annotated Bibliographies (FABs) are collections of abstracts on specific topics in food science and technology. The topics are chosen by the staff of the International Food Information Service as being of particular interest or importance. The topics normally interest individual workers, who may not require the full information provided in Food Science and Technology Abstracts, from which the abstracts for FABs are taken. The size and the cost of the FABs are controlled as much as possible with the interests of individual workers in mind.

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Copies of all original articles referred to in the abstracts may be bought (or occasionally borrowed) from the International Food Information Service. A form for ordering these is provided at the end of this FAB.

Coverage of the subject has been restricted to that of Food Science and Technology Abstracts, which covers over 1200 of the important food journals, patents from 20 countries and books published world-wide. Every effort is made to include all significant references, but editorial discretion is used on the many articles of borderline interest. If the reader particularly needs an exhaustive search of the subject, we will be pleased to provide any other references that we have available. We would, in any case, encourage readers to write or telephone us with any comments or queries that they may have.

H. BROOKES

EDITOR





## 1

[Taste tests in market research.] Der Geschmackstest in der Marktforschung. Kynast, U.

*Brauwelt* 120 (13) 451-454 (1980) [De]

The value of taste tests in market research is briefly discussed. Practical aspects of sensory testing are discussed, with reference to: number of samples; number and training of panellists; selection of panellists to give a representative socio-demographic sample of consumers; aims of sensory testing; test methods (single samples, triangle tests, preference tests, profile analyses, etc.); and evaluation of results. TUB-IGB

## 2

[A study of the behavioural approach to taste. II. Influences of 'home', 'housing' and 'district environmental' factors on food preferences of 5 and 6-year-old children.]

Saito, R.; Sekiguchi, N.; Tanaka, Y.; Eguchi, K.; Soejima, T.; Shimokawa, C.; Igarashi, M.; Mitsuishi, R.; Kobayashi, S.; Ishii, S.

*Japanese Journal of Nutrition [Eiyogaku Zasshi]* 37

(6) 275-288 (1979) [6 ref. Ja, en] [Tokyo Coll. of Domestic Sci., Tokyo, Japan]

## 3

An effective scoring system for sensory evaluation of experimental wines.

Tromp, A.; Conradie, W. J.

*American Journal of Enology and Viticulture* 30 (4) 278-283 (1979) [4 ref. En] [Oenological & Viticultural Res. Inst., Stellenbosch, 7600 South Africa]

A statistical evaluation was made of a balanced 9-category scoring system used to assess the quality of experimental wines for 3 consecutive years. The relatively small standard deviation found when wines were scored in duplicate was indicative of the effectiveness of the system, while the wide range of the scores obtained was sufficient to distinguish between wines in terms of quality. The tasters were also evaluated statistically for both range of scores used and reproducibility. 6 of the 19 tasters scored wines inconsistently, and could therefore be eliminated. With the 9-category system, inexperienced tasters scored wines as well as experienced tasters. The system is easy to use and is recommended for evaluating young experimental wines. AS

## 4

The challenge of flavour stability. [Lecture]

Whitear, A. L.; Carr, B. L.; Crabb, D.; Jacques, D.

*Proceedings, European Brewery Convention* pp. 13-25 (1979) [9 ref. En, de, fr] [Whitbread & Co. Ltd., London, UK]

In a study of beer flavour instability, English, American and European beers were stored at 28°C for ≥ 26 wk and attemperated to 15°C before tasting. Profile analysis was used to assess effects of ageing on flavour; internationally recognised flavour terms were used. Chemical analyses were also carried out using standard methods. Results are reported in tables and graphs, and show that the reduction in positive flavour

attributes such as alcoholic, floral, malty, caramel and body is as important as the increase in aged flavour such as papery/cardboard, leathery, molasses, cheesy and metallic. The reduction in positive flavour attributes and development of aged flavours in beer stabilized with polyvinylpyrrolidone or silica hydrogel was significantly different. No improvement in flavour stability was found in all-malt beers produced using high gravity brewing techniques. [See FSTA (1981) 13 1H6.] SP

## 5

Report on the work of the Flavour Terminology Working Group. [Lecture]

Dalglish, C. E.

*Proceedings, European Brewery Convention* pp. 846-847 (1979) [En] [Brewing Res. Foundation, Nutfield, Surrey, UK]

The work of the Flavour Terminology Working Group over the last few yr is briefly summarized. It is proposed that the Working Group should be terminated at the 1979 EBC Congress. [See FSTA (1981) 13 1H6.] SP

## 6

Utilization of lipolyzed Edam cheese in process cheese. (In 'Proceedings from the first biennial Marshall International Cheese Conference' [see FSTA (1981) 13 1P59]) [Lecture]

Marshall, J. T.

pp. 279-293 (undated) [12 ref. En] [Dep. of Anim. Sci. & Ind., Kansas State Univ., Manhattan, Kansas 66506, USA]

Batches of aged Edam cheese (2-yr old) with various degrees of rancidity (as the only flavour defect) or without rancidity were blended with equal quantities of 3-month old Cheddar cheese and made into processed cheese with or without the addition of jalapeno peppers. The results of organoleptic evaluations by 40 panelists showed that rancidity could be distinguished in specimens without the peppers, whereas with peppers added, even experienced judges could not distinguish the moderately rancid from the non-rancid cheese. It is concluded that the flavour of processed cheese was not improved by adding lipolyzed cheese to the formulation, but that the possibility of blending small quantities of lipolyzed cheese with a bland cheese so as to obtain more pronounced cheese flavour cannot be ruled out. FL

## 7

[High quality level of German whipping cream confirmed. Report on 30th testing of whipping cream by the German Agricultural Society (DLG).] Hoher Qualitätsstand der deutschen Schlagsahne bestätigt. Bericht über die 30. DLG-Schlagsahneprüfung 1980. Koenen, K.

*Molkerei-Zeitung Welt der Milch* 34 (18) 617-618 (1980) [De]

A total of 276 samples of whipping cream (including 12 UHT) was tested for chemical, bacteriological, physical and organoleptic characteristics on 4 March 1980 in Krefeld. 85.6% of the samples (excluding UHT cream) were stated to have been pasteurized at ≥ 100°C; 48 samples were heated twice and 15 samples



were packaged whilst hot. The fat content averaged 32.4%, 2 samples with 37.0 and 37.5% being outside the permitted range (30–36%). All samples gave vol. increases of  $\geq 80\%$  (min. requirement), with 123 samples achieving 100–125% and 93 samples 125–160%. The firmness of the cream after whipping was generally very good, 271 samples attaining the max. number of points (5). In organoleptic tests, 243 samples attained the max. number of points (5) for odour, flavour and appearance. In the overall assessment, 70.6% of the samples qualified for the highest award, 15.6% for the silver medal and 2.2% for the bronze medal. [See FSTA (1980) 12 4P711 for 1979 report]. FL

## 8

### Consumer evaluation of guineas.

Hughes, B. L.

*Poultry Science* 59 (3) 543–544 (1980) [3 ref. En]  
[Poultry Sci. Dep., Clemson Univ., Clemson, S. Carolina 29631, USA]

A study designed to evaluate guinea fowl (keet) as a consumer product was conducted with > 40 families participating. Participants were requested to prepare frozen keets by the method of their choice and, after consuming the prepared product, to complete and return an evaluation form. The majority of the participants either baked or roasted the keets. The meat was considered to be moderate to mild in flavour, tender to very tender, and juicy to slightly juicy. No participant said he disliked keet as a poultry product. Most people said that keet was at least equal to chicken and that they would buy them occasionally, especially if they were available at an economical price. AS

## 9

[Milk and dairy products. Sensory testing. Long-life milk drinks.] Milch und Milcherzeugnisse. Sensorische Qualitätsprüfung. Haltbare Milchlischgetranke. German Democratic Republic, Institut für Milchlorschung der DDR

*German Democratic Republic Standard TGL 26208/29*, 3pp. (1978) [De] [Oranienburg, German Democratic Republic]

This standard specifies the typical appearance, odour and flavour for UHT chocolate-flavoured milk with 1 or 2.5% fat and for UHT vanilla-flavoured milk with 1% fat. The max. unweighted score for each characteristic is 5, with a weighting factor of 2 for flavour but only 1 for appearance and odour. The number of points to be deducted from the max. score depending on the degree of deviation from the typical appearance, odour or flavour is indicated. When points are deducted, the nature of the deviation must be stated. The temp. of the samples must be  $16 \pm 2^\circ\text{C}$ . The test procedure is laid down in TGL 26208/01 [FSTA (1980) 12 4U374]. ADL

## 10

[Milk and dairy products. Sensory testing. Long-life milk.] Milch und Milcherzeugnisse. Sensorische Qualitätsprüfung. Haltbare Milch. German Democratic Republic, Institut für Milchlorschung der DDR

*German Democratic Republic Standard TGL 26208/30*, 2pp. (1978) [De] [Oranienburg, German Democratic Republic]

This standard describes the typical appearance, odour and flavour required of UHT milk with 2.5 or 3.2% fat. The max. unweighted score for each characteristic is 5, with a weighting factor of 2 for flavour but only 1 for appearance and odour. The number of points to be deducted from the max. score depending on the degree of deviation from the typical appearance, odour or flavour is indicated. When points are deducted, the nature of the deviation must be stated. The temp. of the samples must be  $16 \pm 2^\circ\text{C}$ . The test procedure is laid down in TGL 26208/01 [FSTA (1980) 12 4U374]. ADL

## 11

Some aspects of wine research at Long Ashton. (In *The second wine subject day* [see FSTA (1981) 13 2H256]) [Lecture]  
Timberlake, C. F.  
pp. 24–37 (1977) [12 ref. En] [Long Ashton Res. Sta., Bristol, UK]

Wine tasters were presented with 5 white wines in 2 groups of random order and asked to rate each separately on a 0–10 scale for colour, aroma and flavour. The effect of oxidation was studied in wines A and B, where B was oxidized, and processing effects on quality (especially regarding phenolic compounds) were studied in wines C–E, where C was made by a standard crushing method, had 50 p.p.m.  $\text{SO}_2$  added and was pressed in an atm of  $\text{CO}_2$ ; D was made as a red wine with 100 p.p.m.  $\text{SO}_2$  and yeast added and was fermented 1 wk before pressing; and E was made by the Concord process with 50 p.p.m.  $\text{SO}_2$ , heated to  $60^\circ\text{C}$ , held for 30 min, cooled to  $40^\circ\text{C}$ , treated with pectinases and pressed. A preference for natural good colour and unoxidized taste was observed. Correlations between quality and approx. 34 chemical parameters were also investigated in 67 European white wines using a panel of 6 trained tasters. Results indicated that a commercial white wine should be sweetish, low in alcohol, of high pH, contain malic rather than tartaric acid, and have adequate  $\text{SO}_2$  and min. amounts of volatile acids, Fe and Cu.  $\text{SO}_2$  in red wines was examined using 2 commercial wines with and without  $\text{SO}_2$  dosage; preference was for no  $\text{SO}_2$ . It is suggested that there should be a discussion on the contrasting roles of  $\text{SO}_2$  in the 2 wine types. LH

## 12

[New methods for evaluation and analysis of organoleptic qualities of foods and for prediction of their changes. XII. Quantitative analysis of diacetyl and vanillin and determination of their distribution coefficient in water-oil mixtures by means of subjective olfactometry.] Neue Methoden der Be- und Auswertung sensorischer Eigenschaften von Lebensmitteln und der Berechnung ihrer Veränderungen. XII. Die quantitative Analyse von Diacetyl und Vanillin und die Bestimmung ihrer Verteilungskoeffizienten mit Hilfe der 'Subjektiven Olfaktometrie' in Wasser-Öl-Gemengen. Herrmann, J.; Abd-El-Salam, I.



**Nahrung** 24 (3) 273-283 (1980) [19 ref. De, en, ru]  
[Sektion Nahrungsgüterwirtschaft & Lebensmitteltech.,  
Humboldt-Univ., Berlin]

The basic principles of the 'subjective olfactometry' technique, devised by the authors, are discussed; over a specified range, odour intensity is closely related to aroma material concn. Using vanillin and diacetyl in oil, water or oil/water emulsions as examples, it is shown that the partition coeff. (important for the aroma intensity in different substrates) may be determined on the basis of odour intensity, even for substances of unknown structure. [See FSTA (1978) 10 9A532 for part XI, and following abstr. for part XIII.] IN

### 13

[Taste panel members at the Norwegian Institute for Food Research: Selection, training and performance.]

Martens, M.

*NINF Informasjon* No. 2, 31-37 (1980) [7 ref. No]

### 14

Acceptance and product selection of food fortified with the microalga *Scenedesmus*. [Lecture]

Gross, U.; Gross, R.

*Ergebnisse der Limnologie* 11, 174-183 (1978) [14 ref. En, de] [Inst. de Nutricion, Jr. Tizon y Bueno 276, Lima 11, Peru]

54 algal products were tested for acceptability in 3 stages: (i) a 22 day long-term acceptance test, (ii) a sensory test by specialists and (iii) a mass acceptance test. In (i) initial results were misleading because of problems in adaptation to test conditions, but overall taste and appearance evaluation of the products was higher than for conventional food. Test (ii) led to 5 improved products being selected for further tests, viz. algal-supplemented vegetable soup, mazamorra (corn and fruit dessert), fruit pudding, noodles and ravioli. (iii) with 1745 people showed that location and age dictate taste; older people in rural areas showed better acceptance than young, educated urban dwellers. In all tests acceptability was good at up to 13 g/day. Subjective perception of colour was found to interfere with results. Suggestions for algal use as a defatted paler green supplement to conventional foods or as a dark green additive to green foods both have disadvantages. 2 marketing practices are needed, one to suit the rural and one the richer urban areas. [See FSTA (1981) 13 3G187.] LH

### 15

The senses and sensory evaluation of wines. I.

[Lecture]

Amerine, M. A.

*Australian Wine Brewing and Spirit Review* 99 (4), 14-16, (1980) [30 ref. En] [Dep. of Viticulture & Enology, Univ. of California, Davis, California 95616, USA]

The human senses which enable the judge of wine to form an opinion are discussed from a physiological and a psychological aspect, and the sources of errors in the judging process are described i.e. physiological differences and adaptation processes, stimulus error, time-order error and errors of central tendency in scoring. [See following abstr. for part II.] JRR

The senses and sensory evaluation of wines. II.  
[Lecture]

Amerine, M. A.

*Australian Wine Brewing and Spirit Review* 99 (5) 9, 12-15 (1980) [En] [Dep. of Viticulture & Enology, Univ. of California, Davis, California 95616, USA]

Protocols for sensory evaluation of wines are described, including the paired test, the triangle test, and ranking. The relative merits and faults of the systems, and their applicability to various situations are discussed. Other topics considered include consumer testing for preferences, descriptive terminology, and practical considerations in setting up a wine tasting session. The relationship between sensory evaluations and objective measurements of odour and flavour compounds is briefly discussed. [See preceding abstr. for part I.] JRR

### 17

QAV, a new method for the sensory appraisal of quality of processed vegetable varieties.

Adams, M. J.; Bedford, L. V.

*Technical Memorandum, Campden Food Preservation Research Association* No. 230, 25pp. (1979) [1 ref. En]

The QAV (quality appraisal of var.) sensory method is described, which differentiates between qualities of different vegetable var. grown under trial conditions. It is based on the standard Campden (CFPRA) QC6 method of sensory quality assessment of canned fruits and vegetables. Panel selection, sample selection and preparation, assessment of colour, flavour and texture, presentation of results and analysis are described. Quality assessment scoring systems for broad beans (canned or frozen), Brussels sprouts (frozen), cabbage (frozen), carrots (canned or frozen), peas (canned or frozen), green beans (canned or frozen), swedes (frozen), sweet corn (canned or frozen), and examples of record sheets for canned or frozen broad beans, canned carrots (QC6), and analysis of QAV record data are tabulated. RM

### 18

Further studies on Stelvin and related wine bottle closures.

Rankine, B. C.; Leyland, D. A.; Strain, J. J. G.

*Australian Grapepower & Winemaker* 17 (196) 72, 74, 76 (1980) [En] [Roseworthy Agric. Coll., Roseworthy, S. Australia, Australia]

Results are presented of taste tests performed on 3 sets of wines sealed in bottles by various types of screw-top pilfer-proof closures. The 'Stelvin' closures (Australian Consolidated Industries Ltd.) have Al shells and sealing wads made from kraft paper/tin/PVDC and cork or expanded polyethylene laminates. In 2 sets of tests of Stelvin closures vs. corks, wines from bottles sealed by Stelvin closures consistently received higher ratings than those from corked bottles. Red wines showed less variability than white wines. In another set of tastings 1 Stelvin closure was compared with 7 other types of closures which differed in the seal used in the Al shell; substances studied included expanded polyethylene, modified polyethylene, solid and expanded PVC, and a moulded polyethylene plug.



Results are tabulated for 2 claret-type wines and 2 Riesling wines. Expanded polyethylene (Celloseal) and, to a lesser extent, a moulded polyethylene plug (Enoblok) consistently gave the worst ratings, the Stelvin closure and 'Daraform' (modified polyethylene) performed best overall. Increase in wine storage temp. (from 19° to 27°C) increased differences between closures. DIH

## 19

### Expressing flavour: a system for Scotch.

Piggot, J.; Hose, L.; Sharp, R.

*Brewing & Distilling International* 10 (1) 48-49 (1980) [En][Dep. of Food Sci., Univ. of Strathclyde, Glasgow, UK]

The success of a 2-tier system of beer flavour description [see FSTA (1979) 11 9H1359] led to the development of a similar system for the whisky industry, and a preliminary feasibility study has been carried out [see FSTA (1979) 11 9H1448]. A list of 35 terms was proposed, comprising simple and easily understood terminology to provide an overall description of whisky, enabling each separately identifiable flavour note to be named and defined; the list was incorporated in a record form with columns for 'odour', 'flavour by mouth' and 'after-flavour', each sample to be marked on a 5-point scale. 11 assessors used this form to describe the flavour of 10 commercially available whiskies (8 malts, 1 Scotch blend and 1 Irish blend). The assessors were then trained, using 21 reference standards, before re-evaluating the 10 whiskies. Statistical analysis by computer enabled their findings to be plotted as graphs, which showed the value of training the assessors, and the relative importance of 'odour' and 'flavour by mouth' compared with 'after-flavour' in assessing. It was decided that odour assessment alone would suffice. The terms of reference having been reduced to 30, further studies using them with a panel of 15 untrained assessors dealing with 64 whiskies proved that the method enables samples to be grouped or identified individually by untrained assessors. After further study, the list of terms was revised to 37 words (listed). More study is under way so that differences between very similar whiskies may be described. Suitable chemicals are being selected to define precisely the meaning of each term; to date, odour profiles of 184 materials have been collected. At least 8 assessors are considered essential for a panel. KME

## 20

### Scorecard for Mozzarella cheese.

Duthie, A. H.; Lemaire, J. T.; Nilson, K. M.; Partridge, J. A.; Atherton, H. V.

*Cultured Dairy Products Journal* 15 (3) 5-7 (1980) [4 ref. En][Dep. of Anim. Sci., Agric. Exp. Sta., Univ. of Vermont, Burlington, Vermont 05405, USA]

A scorecard has been developed for recording flavour of commercially manufactured Mozzarella cheeses. The card lists 11 defects (including no defect) for appearance, 10 for body/texture and 13 for flavour; the panelist subtracts marks for each defect observed from a max. of 3 for appearance, 5 for body/texture and 10 for flavour. A number of samples can be recorded on each score card and placed in order of total score for the 3 categories. CDP

## 21

[Use of the sensory profile method in sensory analysis of foods.] (In 'Zbornik prednasok zo IV. celostatneho Sympozia o aromatickych latkach v pozivatinach'[see FSTA (1981) 13 5T214].) [Lecture]

Pokorny, J.; Marcin, A.; Dvorakova, L.; Davidek, J. pp. 88-98 (1979) [Cs][Katedra Chem. & Zkouseni Potravin, Vysoka Skola Chemickotech., 166 28 Prague, Czechoslovakia]

The profile method (based on panel evaluation of relative proportion and intensity (6-point) of a number of suitably selected component odours), used in the authors' laboratory for sensory evaluation of foods, is described. The results may be entered on a graph presenting the evaluation as an area above the base line forming a series of peaks similar to a chromatograph, or presented on a circular diagram. Examples of assessment of gingerbread (21 odours considered) and of effects of addition of alanine, lysine, fructose or lactose to the gingerbread are presented by both linear and circular methods. SKK

## 22

[Use of the flavour profile method in sensory analysis of prepared foods.] (In 'Zbornik prednasok zo IV. celostatneho Sympozia o aromatickych latkach v pozivatinach'[see FSTA (1981) 13 5T214].) [Lecture]

Sorman, L.; Hozova, B.; Rajniakova, A. pp. 99-106 (1979) [Sk][Chemickotech. Fak., Slovenska Vysoka Skola Tech., 880 37 Bratislava, Czechoslovakia]

The principles of the sensory descriptive profile procedure [see Cairncross & Sjöström, *Food Technology* (1950) 4, 308] are outlined and its application to panel evaluation of canned peas sterilized (i) in a rotary sterilizer at 121°C for 15 min, (ii) in a stationary sterilizer under the same time/temp. conditions, (iii) as (i) at 121°C for 30 min, or (iv) as (ii) under the time/temp. conditions used for (iii), is graphically presented using ≤ 6 flavour characteristics (pea-like, sweet, starchy, salty, bitter, and acid). Results of panel evaluation of (i)-(iv) on the basis of colour, flavour, aroma and consistency are tabulated; it is concluded that both methods agreed on the order of ranking of (i)-(iv) for organoleptic quality. SKK

## 23

### [Production of quick-frozen fruit purees.]

Faludi, I.; Koncz, K.

*Hűtőipar* 26 (2) 45-49 (1979) [Hu, en, ru][Kerteszeti Egyetem, H-1118 Budapest, Menesi ut 43-45, Hungary]

To comply with new dietary requirements, the natural sugar content of apple purees, prepared from Golden Delicious and Jonathan apples, was supplemented with sorbitol, sodium saccharin, fructose or mannitol to a refractometric solids value of 19%, instead of the usual 26%. The consistency (tested with a Rheomat 15 rotation viscosimeter) and taste (judged by a taste panel) were evaluated both in the fresh product and after 9-15 wk. storage. In the fresh samples no significant difference was detected in viscosity; the



highest value being  $\eta = 3.00 \text{ NS/m}^2$  (in natural quick-frozen puree) and the lowest  $\eta = 2.21 \text{ NS/m}^2$  (fructose supplemented puree). The differences decreased after 9 wk storage and further decreased after 15 wk. Viscosity was reduced in all samples during storage, with no apparent differences in flavour. Anise, lemon, caraway seed, cinnamon, vanilla, and clove extracts were added to the samples; all 6 condiments gave a pleasant taste, to Jonathan apples, but lemon, cinnamon, and vanilla extracts gave the best results with Golden Delicious. The samples were enriched with vitamin C by the addition of rosehips or blackcurrants, and beet sugar added to a refractometric solids value of 20% and quick-frozen at  $-20^\circ\text{C}$ . The highest vitamin C content (68.11 mg) was in the samples containing 60% apple and 20% rosehips and blackcurrants (17.26% less after storage for 14 weeks at  $-20^\circ\text{C}$ ). The same sample was also given the best marks by the tasting panel. ESK

## 24

### Quality evaluation of onion.

Smittle, D. A.; Hayes, M. J.; Dickens, W. L.  
*Research Report, Georgia Agricultural Experiment Stations* No. 336, 10pp. (1979) [6 ref. En] [Dep. of Hort., Coastal Plain Sta., Tifton, Georgia 31794, USA]

Cured Granex onions from 6 locations in Georgia and 1 in Texas, separated into 1.75–2.00 in and 2.75–3.00 in diam. lots were used to evaluate sensory quality and determine chemical composition. Taste panel evaluation showed a preference for larger onion bulbs, and in combination with chemical analyses indicated that larger onions were sweeter and less pungent. No preference was detected for onions from various areas of Georgia; Texas onions were less preferred and rated more pungent, as confirmed by higher pyruvate concn. ( $3.8 \mu\text{M/g}$ , vs. 2.1–3.2). Sugar contents and sweetness rating of Texas onions were  $\geq$  Georgia grown onions. Correlation analysis suggested that pungency (measured by sensory panel or pyruvate concn.) was the main factor affecting preference. RM

## 25

### Flavour stability studies: the use of fractional factorial designs.

Drew, I.; Whitear, A. L.  
*Journal of the Institute of Brewing* 86 (6) 269–273 (1980) [11 ref. En] [Watney Mann & Truman Brewers, Mortlake, London SW14 7ET, UK]

Use of a fractional factorial experimental design was adopted to study effects of 8 variables (each at 2 levels) on beer flavour and flavour stability using only 8 test beers and a control, in place of the 512 comparisons that would be required using a full factorial design. Beers were assessed by flavour profile panels either immediately after bottling, or after storage at  $20^\circ\text{C}$  for 2 wk. Method of assessing effect of each variable on individual flavour descriptors is described in some detail; each beer is used as a comparison and increase or decrease in a particular descriptor in each test beer vs. the comparison is marked on a score card as '+' or '-' resp. in columns corresponding to those variables in which the test beer differs from the comparison. The net score then shows, qualitatively, the effect of each

variable on flavour descriptors. Details are given of the levels of each variable in the beers, and some of the results are tabulated. The 8 variables were divided into 3 groups on the basis of the results; those promoting increase in oxidized flavours during storage (increase in headspace air, pasteurization units and Cu content), those tending to reduce oxidation (addition of  $\text{SO}_2$  or lupulin and polyvinylpyrrolidone treatment), and those without obvious effect on oxidation (Fe level and proteolytic enzyme treatment). Useful and valid information is obtained from a small number of experimental beers, but results are difficult to interpret and do not give precise information about effect of every variable individually. DIH

## 26

### Sensory and non-sensory assessment of fish. (In 'Advances in fish science and technology' [see FSTA (1981) 13 6R300].) [Lecture]

Connell, J. J.; Shewan, J. M.  
pp. 56–65 (1980) [129 ref. En] [Torry Res. Sta., Aberdeen, UK]

The status and roles of all methods of fish assessment are critically evaluated with particular reference to developments over the last decade and to future possibilities. Sensory methods, both subjective and objective assessments, are dealt with first as being of most importance in any system of quality assessment. Non-sensory methods for assessing spoilage and deterioration (chemical and biochemical, physical, and bacteriological methods), for assessing safety and wholesomeness, and for detn. of composition and identity are then discussed. AL

## 27

### The analysis of a range of non-volatile constituents of cooked haddock (*Gadus aeglefinus*) and the influence of these on flavour. (In 'Advances in fish science and technology' [see FSTA (1981) 13 6R300].) [Lecture]

Thomson, A. B.; McGill, A. S.; Murray, J.; Hardy, R.; Howgate, P. F.  
pp. 484–488 (1980) [24 ref. En] [Torry Res. Sta., Aberdeen, UK]

Skinned fillet samples (each weighing 100 g) were prepared from commercially supplied cod, haddock, whiting, lemon sole and plaice judged to have been held on ice for 2–4 days. The samples were cooked in casseroles over boiling water for 30 min and then tasted by untrained assessors who attempted to differentiate the 5 spp. Results indicated that the assessors could not readily identify the spp. The highest number of correct responses was obtained with haddock and this spp. was used in subsequent studies. These included chemical analyses of raw fish, cooked whole fish, cooked muscle and cooked liquor for amino acids, nucleotides, nucleosides, free bases, sugars, sugar phosphates, Na, K, Mg, Ca, P and chlorides. In addition, a trained taste panel was used to examine the flavour profiles of the various haddock samples, of haddock extracts and of flavour isolates separated by column chromatography. Results are detailed in tables. Haddock muscle was described as possessing 5 major flavour notes, namely salty, sweet, meaty (boiled), chicken-like and boiled cabbage. Tasting of individual groups of compounds indicated that inorganic compounds are salty, anserine



is bitter, and amino acids are of a slightly sweet/boiled cabbage character. The results confirmed that the major flavour notes associated with cooked haddock are non-volatile. JA

## 28

**Some observations on the ambient and chill storage of blue whiting (*Micromesistius poutassou*).** (In 'Advances in fish science and technology' [see FSTA (1981) 13 6R300]) [Lecture]  
Smith, J. G. M.; Hardy, R.; Thomson, A. B.; Young, K. W.; Parsons, E.  
pp. 299-303 (1980) [8 ref. En] [Torry Res. Sta., Aberdeen, UK]

Blue whiting were caught in Feb., March and April when the majority were at the pre-spawning, in-spawning and post-spawning stage, resp. Samples of the catch were stored under various conditions: whole fish were stored for  $\leq 48$  h in plastics boxes on deck at ambient temp. (9-13°C in Feb., 10-14°C in March and April); whole and gutted fish were stored for  $\leq 11$  days in plastics containers at chill temp. (approx. 1°C) either (i) in ice, (ii) in chilled sea water or (iii) in chilled sea water changed daily. Samples withdrawn at intervals during storage were filleted, skinned, minced and analysed for hypoxanthine, dimethylamine and trimethylamine. Skinned fillets were also cooked and subjected to sensory evaluation of odour, texture, flavour and overall acceptability. Results are detailed in graphs and tables and indicated that post-spawning whiting (i.e. those caught in April), whether whole or gutted, had a shorter storage life under both ambient and chill conditions than pre- and in-spawning fish. With all samples, as expected, increases in hypoxanthine, dimethylamine and trimethylamine concn. during storage were more rapid at ambient temp. than at chill temp. Overall acceptability scores indicated a preference for whiting caught in March. [See also following abstr.] JA

## 29

**Texture profile panelling: a systematic subjective method for describing and comparing the textures of fish materials particularly partial comminutes.** (In 'Advances in fish science and technology' [see FSTA (1981) 13 6R300]) [Lecture]  
Weddle, R. B.  
pp. 409-417 (1980) [1 ref. En] [Unilever Res., Aberdeen, UK]

This paper reports on the utilization of a previously described texture profile method [see FSTA (1977) 9 3S497] for describing the sensory differences between intact and comminuted fish and for describing how their texture deteriorates during frozen storage. The fish materials studied were: fresh cod, coley, plaice and salmon fillets frozen in rectangular blocks and stored at -29°C; fresh cod fillets comminuted to different degrees (e.g. strips approx. 1 cm wide, approx. 1 cm cubes, mince), frozen in rectangular blocks and stored at -29°C, except for one sample of mince which was stored at -10°C; and a commercially produced sample of mince which had been held in cold storage for >6 months. All samples were presented for sensory evaluation as breaded steaks (76 x 38 x 12 mm) which

had been fried for 4 min/side at  $180 \pm 2^\circ\text{C}$  in 2 mm vegetable oil. Details are included of the scoring system used. The results obtained were subjected to statistical analysis (e.g. multi-factor analysis of variance, principal components analysis) and are presented in tables, texture profile diagrams and principal component graphs. Comparison of fish spp. indicated that cod and coley are very similar, while plaice is softer and juicier with a less obvious structure and salmon is much tougher and drier with a more obvious structure. Comminution had only a slight effect on juiciness and toughness and the structure component was not affected until the fish was minced. Toughness, dryness and structure increased significantly during frozen storage, the increase being more marked in comminuted fish than in intact fish. JA

## 30

**A comparison of different methods of freshness assessment of herring.** (In 'Advances in fish science and technology' [see FSTA (1981) 13 6R300]) [Lecture]  
Damoglou, A. P.  
pp. 394-399 (1980) [16 ref. En] [Dep. of Agric., Belfast, N. Ireland]

Several methods were used to assess the freshness of herring caught off Northern Ireland and held at 0°, 5° or 10°C for up to 20 days. The methods used were: sensory evaluation of odour; detn. of trimethylamine and hypoxanthine contents in the homogenized fish; an instrumental method employing a Torrymeter used in the individual mode; and a bacteriological method involving preparation of serial decimal dilutions of portions excised free of muscle, incubation on nutrient agar plates at 22°C for 5 days and identification of the colonies produced. Results are detailed in tables, and in graphs which show the relationships between the results and storage time at the 3 temp. It is concluded that, of the 4 methods examined, the Torrymeter would be the most useful for determining herring freshness. However, the initial Torrymeter reading varies with herring fat content; but, since the herrings studied show a regular seasonal variation in fat content, it should be possible to devise a table relating the Torrymeter reading to this seasonal variation. JA

## 31

**Consumer and instrumental edibility measures for grouping of fish species.** (In 'Advances in fish science and technology' [see FSTA (1981) 13 6R300]) [Lecture]  
King, F. J.; Kapsalis, J. G.; Cardello, A. V.; Brooker, J. R.  
pp. 404-409 (1980) [En] [Nat. Marine Fisheries Service, N. E. Fisheries Cent., Gloucester Lab., Gloucester, Massachusetts, USA]

In connection with a project undertaken by the US National Marine Fisheries Service, aimed at developing and implementing a new system for establishing market names for fishery products, a model retail identification plan has been proposed by the Brand Group Inc. (Chicago, USA) which provides a system for identifying fish sp. with their forms of presentation and preservation. The Brand Group identified the following edibility factors as being generally the most important in grouping of sp.: intensity of flavour, fat content,



natural odour of raw and fresh meat, and flakiness, firmness, coarseness, colour and moisture of cooked meat. The retail identification plan recommended the development of a data bank of edibility profiles. In order to make such a development, the US Army Natick Laboratories have initiated a study with the objectives of: (i) testing the validity of the edibility characteristics, scaling procedure and grouping procedure suggested by the Brand Group; (ii) developing and evaluating appropriate standardized sensory and instrumental methods for assessing the edibility characteristics of fish; (iii) evaluating the relationship between instrumental and organoleptic indices of edibility; and (iv) grouping fish sp. into categories according to their similarities in edibility characteristics. This paper discusses the problems which led to the establishment of the project, outlines previous work on the retail identification plan, describes the procedures used in determining the edibility characteristics (e.g. sensory evaluation, instrumental methods such as the Instron system, GLC and MS) and considers the procedures used in evaluating the data obtained (e.g. multi-dimensional scaling analysis, magnitude estimation). JA

### 32

#### Processed meats and protein functionality.

Solomon, L. W.

*Dissertation Abstracts International*, B 41 (2) 509-510: Order no. 80-17987, 135pp. (1980) [En] [Univ. of Illinois, Urbana, Illinois 61801, USA]

In connection with the development of new and improved ways of making sectioned and formed meat products, studies were conducted with the aim of delineating what chemical and/or physical changes occur in muscle proteins during processing. In one experiment, 3 major ham muscles were isolated, trimmed and tumbled (either with or without a vacuum) 4 or 48 h post-mortem with 18% curing brine solution. Studies of brine absorption within the muscles indicated that use of a vacuum and of pre-rigor meat independently increased NaCl absorption. Vacuum tumbling also increased the breaking strengths of ham slices. Thus, vacuum is implicated for increased brine adsorption and binding functionality. A second experiment examined the effects of vacuum mixing and state of rigor on protein extraction and functionality of beef. Beef muscles excised either pre- or post-rigor were ground and then mixed either with or without vacuum. A procedure for precipitating crude myosin (CM) was then carried out and the protein functionality of the CM fractions was examined. Vacuum treatment, increasing the mixing time and use of pre-rigor meat resulted in greater CM yields. Mixing, irrespective of the use of vacuum, produced a linear decrease in binding ability and an increase in the amount of protein needed to form a gel. In a third study, pieces of cow chuck were either not treated with papain or injected with or soaked in papain solution and then mixed without binder, or with CM solution or freeze-dried CM. The material was then stuffed into fibrous casings, frozen and stored for 2 months. Sensory evaluation indicated that papain decreased binding between meat pieces and that freeze-dried CM produced strong binding between meat pieces even in those treated with

papain. A taste panel indicated a preference for meat treated with papain and mixed with freeze-dried CM. JA

### 33

#### ASTM manual on consumer sensory evaluation.

[Booklet]

Schaefer, E. E. (United States of America, American Society for Testing & Materials) (Editor)

iii + 53pp. No. 04-682000-36 (1979) [23 ref. En] [1916 Race Street, Philadelphia, Pennsylvania 19103, USA; American Society for Testing and Materials. Price \$7.75]

This manual, ASTM Special Technical Publication 682, aims to provide an informative guide on consumer sensory evaluation for management and technical administrators. Chapters are: Background to a systems approach; The role of sensory evaluation in product life cycle; General evaluation factors; Sampling; Test procedures; Obtaining the data; Data analysis; Reporting results of research; and Practical aspects or pitfalls of consumer sensory evaluation. AL

### 34

#### [The group factor in the sensory evaluation of foods.] Sauvageot, F.

*Cahiers de Nutrition et de Dietetique* 15 (3) 169-190 (1980) [many ref. Fr, en] [Lab. de BPC, ENSBANA Campus Univ. 21100, Dijon, France]

Reliability of sensory evaluation depends on the individuals comprising the assessing group, each of whom possesses differing thresholds and degrees of sensitivity. Reference is made to studies of gustatory and olfactory deficiencies, with mathematical interpretation of results and graphs of levels of detection. Other variation factors include time of adaptation to odours, nature of saliva, age, sex, smoking habits and health (common cold, sinusitis). The constitution of groups of sensory assessors is discussed, citing 5 procedures and criteria for selection from relevant literature. Difficulties are considered: time available, individual adaptability to group, lack of satisfactory descriptive terminology, techniques of making minute changes in quality of foods assessed, and detn. of thresholds applicable. KME

### 35

#### Sensory science today.

Pangborn, R. M.

*Cereal Foods World* 25 (10) 637-640 (1980) [28 ref. En] [Food Sci. & Tech., Univ. of California, Davis, California, USA]

Consideration is given to recent advances in sensory science and to the use of the correct methodology in sensory analysis. Tabulated data present the multiple applications of sensory analyses, and examples of common misuse of sensory procedures. VJG

### 36

[Evaluation of florentines on the basis of chemical and sensory tests.] Die Beurteilung von Florentinern auf der Grundlage chemischer und sensorischer Untersuchungsergebnisse. Tell, E.; Röhrle, M.



**Getreide, Mehl und Brot** 33 (8) 207-210 (1979) [26 ref. De] [Landesuntersuchungsamt für das Gesundheitswesen Südbayern, Postfach 40 11 80, 8000 München 40, Federal Republic of Germany]

282 florentine biscuits were analysed for fat composition. In general, those made from industrially prepared caramel masses contained 0-10% milk fat (of total fat) and those prepared entirely 'in house' by confectioners contained 20-100% milk fat. Fat composition of a number of industrially prepared caramel masses is tabulated; a number did not fulfil requirements for fine bakery products, in particular by containing hardened marine oils. Sensory evaluation of florentines showed that products containing > 50% milk fat (of total fat) were reliably identified as having butter flavour, whereas those with < 20% milk fat were not. Sensory studies on caramel masses prepared in the laboratory showed that 0, 50 or 100% milk fat masses were highly significantly classified into 'not like butter' and 'like butter' groups, as appropriate, masses with 20% milk fat were significantly classified as 'like butter' and those with 10% could not be significantly classified. It is suggested that florentines should contain at least 20% of the fat as milk fat, the remaining fat being high quality plant fat. DIH

### 37

**Sensory assessment of cooked milled rice.** [In 'Proceedings of the workshop on chemical aspects of rice grain quality' [see FSTA (1981) 13 7M662]] [Lecture]

Mundo, A. M. del pp. 313-325 (1979) [13 ref. En] [Univ. of the Philippines at Los Banos, Coll., Laguna, Philippines]

The procedure for sensory assessment of milled cooked rice used at the Institute of Human Ecology is presented. It includes harvesting and milling information, cooking the rice samples, sensory assessment by laboratory and consumer panels, scorecards, and data conversion for analysis. The relations between physico-chemical properties, cooking characteristics and eating quality scores are briefly discussed. AS

### 38

**Clinical studies with low-lactose milk.**

Reasoner, J.; Maculan, T. P.; Rand, A. G.; Thayer, W. R., Jr.

*American Journal of Clinical Nutrition* 34 (1) 54-60 (1981) [26 ref. En] [Dep. of Med., Rhode Island Hospital, Brown Univ., Providence, Rhode Island 02902, USA]

A low-lactose milk was evaluated for taste acceptance and clinical symptomatology by means of a double-blind control study in 2 groups of individuals. One group consisted of 9 milk intolerant individuals, while the other consisted of 5 milk tolerant individuals. Each week for 9 wk the participants were given a coded sample of skim milk, lactose hydrolysed milk, skim milk plus glucose, or sweet acidophilus milk. Each participant was asked to consume 4 l milk/wk and keep a daily log of symptoms (pain, bloating, nausea, flatus, emesis, bowel frequency) along with taste acceptability. After assigning a numerical value to the intensity of

symptomatology a  $X^2$  analysis was performed on the data. In the milk intolerant population lactose hydrolysed milk produced significantly milder ( $P < 0.05$ ) pain and gas symptoms than the nonhydrolysed milks. Bowel frequency was not altered between the types of milk in both groups. The lactose hydrolysed milk did not reduce the symptoms of lactose intolerance in the milk intolerant population to the response of the control group. Although both study populations found decreased taste acceptability to the lactose hydrolysed milk, a taste panel assessment did not show any significant differences in the milks. AS

### 39

**System development for flavours of the future**

May, W. A.; Fishetti, F. F.

*Cereal Foods World* 25 (3) 98-100 (1980) [2 ref. En] [Fritzsche, Dodge & Olcott Inc., New York, New York, USA]

To study the flavour character profiles of a lemon flavour for application in a lemonade beverage, a modified magnitude estimation scaling technique is used which requires selection of the proper attributes. The attributes selected for measuring acceptance and character include: overall liking; sweetness; tart/sour; natural lemon flavour; and juice/candy. The target samples (A and B) were perceived to have 2 distant profile characters: Lemon Flavor No. 1 and Lemon Flavor No. 2. Gas chromatographic analyses of these 2 flavours were conducted to determine the chemical differences between them. Magnitude estimate panels were run and analysed. To determine the role specific aldehydes play in developing flavour impact, several grapefruit flavours were studied and their performance analysed in product application. VJG

### 40

**Methods for the sensory analysis of food. I.**

**Introduction and general guide to methodology.**

United Kingdom, British Standards Institution  
*British Standard BS 5929:Part 1*, 12pp. ISBN 0-580-11510-0 (1980) [En] [2 Park Street, London W1A 2BS, UK]

This part of the standard describes methods for the examination of food products by sensory analysis, including the statistical techniques required for analysis of the results. The methods are not intended to be fully applicable to consumer tests. It covers general information, including basic principles, statement of problem, choice of method and assessors, material to be tested, test rooms, apparatus, and conduct of test. The commonly used methods are described; they are grouped into difference methods (paired comparison test, triangular test, duo-trio tests, 2 out of 5 test, and 'A' or 'not A' test); methods of using scales and categories (classification, ranking, rating, scoring, and grading); analytical or descriptive methods (simple descriptive test and sensory profile tests); and sensitivity methods. A table shows rank totals required for significance at the 5% level ( $P \leq 0.05$ ). [See FSTA (1976) 8 1U3 for BSI terms relating to sensory analysis.] AL



41

[General rules for sensory tests.]

Japan, Japanese Industrial Standards Committee  
*Japanese Industrial Standard* JIS Z 9080-1979, 11pp.  
 (1979) [Ja]

42

**Concordance testing: with a nonparametric rating scale.**

Morton, R. H.

*Canadian Institute of Food Science and Technology Journal* 13 (3) 112-114 (1980) [8 ref. En, fr] [Canberra Coll. of Advanced Education, Canberra, ACT 2616, Australia]

A nonparametric statistical test of the concordance between several panelists in a sensory evaluation series is detailed, discussed and illustrated. It is appropriate when accurate ranking of all samples cannot be achieved, and/or the likelihood of ties is substantial, and/or the observations are already graded but not fully ranked. It has the additional feature, over the usual rank test, of allowing concordance independently of whether the samples differ significantly or not. AS

43

**A method of selecting panel for hedonic assessment of new food products.**

Golovnja [Golovnya], R. V.; Jakovleva [Yakovleva], V. N.; Cesnokova [Chesnokova], A. E.; Matveeva, L. V.; Borisov, Yu. A.

*Nahrung* 25 (1) 53-58 (1981) [9 ref. En, de, ru] [Inst. Elementoorganicheskikh Soedinenii AN SSSR, Moscow, USSR]

Members of a panel to evaluate the quality of synthetic flavours and new foods are selected according to their sensitivity to the 4 basic tastes. Sensitivity was tested by using, for each test aqueous solution, 9 different concn. equidistant above a selected concn. Solutions of concn. grades 1-4, 5-6 and 7-10 represented increased, average and decreased sensitivity, resp. The selected panel should represent the consumer's expectations or preferences. IN

44

**[Fundamentals of sensory evaluation of foods. I. The taste panellist as a test instrument.]** Grundlagen der sensorischen Beurteilung von Lebensmitteln. I. Der Mensch als Messinstrument.

Dürr, P.

*Alimenta* 19 (5) 115-118 (1980) [18 ref. De, en] [Forschungsanstalt für Obst-, Wein- & Gartenbau, CH-8820 Wädenswil, Switzerland]

Sensory analysis may be defined as the measurement of food properties by the use of human senses. Relevant knowledge on cognition from the science of psychophysics is discussed. The relation of perceived intensity to the intensity of the stimulus is described by a power function [Stevens' law, *Psychological Review* (1957) 64, 153-181]. Most important for practical work are question/answer relations. The sense modalities are briefly mentioned. AS

45

**[Fundamentals of sensory evaluation of foods. II. The quality of panellists.]** Grundlagen der sensorischen Beurteilung von Lebensmitteln. II. Die Qualität des Prüfers.

Dürr, P.

*Alimenta* 19 (6) 167-170 (1980) [17 ref. De, en] [Forschungsanstalt für Obst-, Wein- & Gartenbau, CH-8820 Wädenswil, Switzerland]

A useful 'instrument', physical or human, has to provide reproducible data in relation to its discrimination capacity. The quality of sensory test panellists is dependent on training, experience and above all on personality. Criteria for the selection of panellists are discussed. Training is necessary for reliable results and is important for motivation for voluntary long-term cooperation in a sensory panel. Sensory testing is as good as its weakest link, which is often insufficient motivation on the part of the panellists. [See preceding abstr. for part I.] AS

46

**[Fundamentals of sensory evaluation of foods. III. Scales in sensory measurement.]** Grundlagen der sensorischen Beurteilung von Lebensmitteln. III. Das Messen mit Skalen.

Dürr, P.

*Alimenta* 20 (1) 15-17 (1980) [17 ref. De, en] [Forschungsanstalt für Obst-, Wein- & Gartenbau, CH-8820 Wädenswil, Switzerland]

Sensory measurement is the assignment of numbers to stimuli according to a scale. 4 types of scale are classified by the information level, the accuracy of results and the task of the judge: nominal, ordinal, interval and ratio scales. Limited point scales are popular. When used in sensory analysis, their information level becomes optimal. The magnitude of small differences can only be measured indirectly, e.g. according to the Signal detection theory [see O'Mahoney, *FSTA* (1979) 11 6A437]. [See preceding abstr. for part II.] AS

47

**Flavor profile analyses of cooked beef loin steaks.**

Berry, B. W.; Maga, J. A.; Calkins, C. R.; Wells, L. H.; Carpenter, Z. L.; Cross, H. R.

*Journal of Food Science* 45 (5) 1113-1115, 1121 (1980) [8 ref. En] [Meat Sci. Res. Lab., USDA-SEA-AR, Beltsville, Maryland 20705, USA]

Short loin steaks selected from beef carcasses representing wide ranges in USDA maturity score (A, B, C, and E) and marbling level (high = moderate to moderately abundant, medium = slight to modest and low = practically devoid to slight) were subjected to flavour profile analyses. Beef from E maturity carcasses had higher aroma and flavour amplitudes and a greater predominance of "grassy" flavours than did beef from carcasses of other maturity groups. "Astringent" aftertaste was common to most samples. Analyses obtained in our study agree with earlier flavour profile studies conducted on beef of various USDA quality grades. Flavour profiles were developed for steaks from the same carcasses that had provided steaks previously



identified as "desirable" or "undesirable" in flavour by 2 separate panels using hedonic flavour rating scales. "Sweet" and "browned" were typical flavours of steaks previously classified as desirable in flavour, while "grassy" and "astringent" were frequently noted flavours of steaks previously classified as undesirable in flavour. Marbling and fat content were higher in steaks previously classified as desirable in flavour, than in steaks classified as undesirable in flavour. IFT

## 48

### Relationship of chewing sounds to judgments of food crispness.

Christensen, C. M.; Vickers, Z. M.

*Journal of Food Science* 46 (2) 574-578 (1981) [12 ref. En] [Monell Chem. Senses Cent., 3500 Market Street, Philadelphia, Pennsylvania 19104, USA]

Relationships between biting and chewing sounds and judgments of food crispness were examined in 2 studies. In the 1st, subjects used magnitude estimation to separately judge loudness of chewing sounds and crispness of a wide range of wet and dry crisp foods, such as biscuits, celery, radish and turnips. Judgments of perceived crispness and loudness were highly correlated both when food samples were fractured by single bites and when further broken down by chewing. In the 2nd study, biting and chewing sounds were blocked by a loud masking noise. Subjects had no difficulty determining crispness. Correlations between judgments obtained with and without an auditory block were high. It is proposed that vibrations produced by fracturing crisp foods may underlie the perception of crispness. IFT

## 49

### [Sensory determination of bread crumb consistency.]

Pokorny, J.; Marcin, A.; Davidek, J.; Holas, J.

*Mlynsko-Pekarensky Prumysl* 26 (5) 157-160 (1980) [7 ref. Cs] [VSCHT, Prague, Czechoslovakia]

The consistency (texture) patterns, found by a team of trained evaluators agreed with the recipes. The evaluation is rather complex and profile differences may appear with non-specialists. The method is designed to cope with various bread types as given in recipes, and for different technologies. Discrimination by testers using the method should be assessed before practical testing to determine the effect of factors, such as age, training, etc. STI

## 50

### Use of the "SMURF" in taste analysis.

Birch, G. G.; Munton, S. L.

*Chemical Senses* 6 (1) 45-52 (1981) [14 ref. En] [Nat. Coll. of Food Tech., Univ. of Reading, Weybridge, Surrey, KT13 0DE, UK]

An improved moving chart recording of intensity/time of taste response has been achieved using a potentiometer 'dial box' linked by a cable to a Telsec recorder. The device allows rates of taste response to be determined and is described as a Sensory Measuring Unit for Recording Flux (SMURF) on the assumption

that the flux of stimuli at the taste receptor is responsible for the time course of response. 14 trained and 16 untrained panellists evaluated one standard and 4 unknown sucrose solutions using the SMURF and determined their intensity and persistence time of response for each of these same solutions by conventional interval scaling and use of a stop-clock. The SMURF gave results which were higher (but not significantly so) than the conventional method. Trained panellists tended to prefer the SMURF and found it quicker and easier to use than the conventional method. Untrained panellists tended to prefer the conventional method but these results were generally not significant. The SMURF is therefore an extremely useful device in reducing time and effort whilst still maintaining accuracy in the measurement of intensity and time of taste response. The SMURF was also used to obtain intensity/time data for 3 other sugars so that a comparison between the sugars could be made. AS

## 51

### [Psychophysics of sweet taste. I. Goals and methods of investigation.] Beiträge zur Psychophysik des Süßgeschmacks. I. Aufgabenstellung und Untersuchungsmethoden.

Hoppe, K.

*Nahrung* 24 (10) 967-979 (1980) [42 ref. De, en, ru] [Zentralinst. für Ernährung, Potsdam-Rehbrücke, German Democratic Republic]

Psychological and physiological aspects of sensory evaluation of sweetness are discussed, with special reference to the problem of retention of sensory acceptability of foods in which sucrose is replaced by other sweeteners. Methods for evaluation of tastes are briefly discussed, with special reference to the taste discrimination threshold. A new procedure is described in detail, based on the dependence of the probability of detection of a difference on the intensity of the stimuli, which is linear and represents the start of stimulus/response curve. Statistical analysis of the results is described. Application of similar principles to evaluation of relative sweetness is also considered.

AJDW

## 52

### The wide scope of sensory evaluation. [Conference proceedings]

United States of America, Institute of Food Technologists, Sensory Evaluation Division  
*Food Technology* 34 (11) 55-66 (1980) [En]

4 papers are given which were presented at a symposium held by the Sensory Evaluation Division during the 40th Annual Meeting of the Institute of Food Technologists in New Orleans, Louisiana on June 8-11, 1980. The papers were: Sensory evaluation in research and development, by C. G. Tassan (pp. 57-59). Sensory evaluation in marketing, by J. Pearce (pp. 60-62). Sensory evaluation in operations, by A. Merolli (pp. 63-64). Sensory evaluation in distribution, by E. Skinner (pp. 65-66). JA



## 53

[Sensory analysis methods in research, development and practice.]

Barvir, J.; Pokorny, J.

*Prumysl Potravin* 31 (11) 659–661 (1980) [Cs] [Statni Inspekce Jakosti Virobku Potravinarskeho Prumyslu, Prague, Czechoslovakia]

Groundnuts roasted for 8 or for 12 h, beef broth, beef broth with sodium glutamate, gingerbread, chicken spread, and plum brandy made in May and Aug. in 2 distilleries were assessed organoleptically by the tetrad test [see FSTA (1973) 5 8A394] in comparison with the triangle and paired tests. The relative capacities of the tests to differentiate between roasting time, duration of storage, extent of sodium glutamate addition, to broth and chicken spread, quality of baking fat, or time and place of distillation were evaluated. It was generally concluded that the tetrad test was superior to the other 2. Further comparisons of triangle, pair and serial tests were carried out on coffee, various chocolates, white and red wines, a sauce and liver spread, the values of the different tests in assessing selected characteristics being examined; some of the finding are tabulated. SKK

## 54

[Organoleptic evaluation of meat products. II.]

Touraille, C.

*Viandes et Produits Carnes* 2 (1) 29–34 (1981) [17 ref. Fr] [Sta. de Recherches sur la Viande, INRA-Theix, 63110 Beaumont, France]

Sensory evaluation of meat and meat products is discussed, with reference to: difference tests; ranking tests; magnitude estimation procedures; planning of questionnaires; evaluation of appearance, taste, flavour, and texture; factors influencing responses of panellists; and interpretation of the results of sensory tests. [See FSTA (1981) 13 4S570 for part I.] AJDW

## 55

[Handbook of sensory analysis.]

Lundgren, B.

*SIK Rapport* No. 470, 207pp. (1981) [Sv]

This detailed manual of sensory analysis of foods includes the following sections: Introduction [covering special nomenclature, and a bibliography] (pp. 3–6); Applications of sensory analysis (pp. 7–10); The role of product test laboratories in the food industrie (pp. 11–21); Reporting of sensory data (pp. 22–31); Difference and preference tests (pp. 32–34); Descriptive tests (pp. 35–101); Psychophysics (pp. 102–118); Factors to be considered in sensory analysis (pp. 119–137); Panels (pp. 138–155); and statistical methods (pp. 156–194). 2 appendices comprise reprints of a paper by Roessler et al. on statistical tables for estimation of significance in sensory tests [*Journal of Food Science* (1978) 43, 940–947], and a paper by Sidel & Stone on experimental design and analysis of sensory tests [*Food Technology* (1976) 30 (11) 32–38]. AJDW

## 56

Problems in sensory evaluation of citrus products. [Lecture]

Fellers, P. J.

*ACS Symposium Series* 143, 319–340 (1980) [33 ref. En] [Dep. of Citrus, Univ. of Florida, Agric. Res. & Education Cent., PO Box 1088, Lake Alfred, Florida 33850, USA]

Problems with sensory evaluation of citrus fruit or products, especially as they pertain to Florida, are discussed, covering selection of panellists, sample preparation (fresh juice, citrus segments, freeze-concentrated orange juice), conducting sensory tests, varietal considerations, colour effect, specific citrus flavour attributes, and problems of citrus sensory evaluation research. [See FSTA (1981) 13 11J1587.] AL

## 57

[Evaluation of breads with various dietary fibre contents.]

Engelen, M. R.; Katan, M. B.

*Voeding* 42 (6) 182–185 (1981) [10 ref. Nl, en]

[Vakgroep Humane Voeding, Landbouwhogeschool, Wageningen, Netherlands]

Taste panel trials were conducted using panels comprising 48 housewives (equal numbers habitually consuming wholemeal bread, brown bread and white bread), to evaluate relative preferences for white bread, brown bread, wholemeal bread, and breads in which 4, 8, 16 or 32% of white flour had been replaced by bran. Graphs of results are given. The sample with 16% of white flour replaced by bran was preferred by all groups; samples with 4 or 32% of white flour replaced by bran were relatively poorly accepted. Further trials were conducted after the panellists had consumed the 16% bran bread for 4 wk; overall, the 16% bran bread was preferred to conventional brown, white or wholemeal breads. Panellists normally consuming white bread rated white bread and the 16% bran bread higher than brown or wholemeal breads; differences in preference between breads by panellists habitually eating brown or wholemeal breads were relatively small. It is suggested that the higher acceptability of the 16% bran bread over conventional brown breads is due to the absence of aleurone components giving a typical brown bread flavour. AJDW

## 58

Comparative sensory analysis of aquacultured and wild yellow perch (*Perca flavescens*) filets.

Lindsay, R. C.

*Journal of Food Quality* 3 (4) 283–289 (1980) [20 ref. En] [Univ. of Wisconsin-Madison, Madison, Wisconsin, USA]

Aquacultured yellow perch (AYP) and wild perch (WP) were filleted, washed and held at 2°C until prepared. Perch were oven-broiled in butter at 233°C for 5–7 min or battered, breaded and deep fat fried in corn oil at 191°C. Cooked filets were presented to 20–30 experienced panel members, and hedonic scales and quantitative descriptive analysis scales were obtained.



AYP generally were bluish-green and slimier than WP; their cooked fillets were whiter and at least as firm as those of WP (deep-fried fillets of AYP were firmer than those of WP). Sensory evaluation seemed most affected by the intensity of off-flavours (earthy or musty) in a few AYP, probably caused by blue-green algal growth. Deep-frying reduced the intensity of such flavours. LH

## 59

### Statistical properties of simple sensory difference tests: confidence limits and significance tests.

Smith, G. L.

*Journal of the Science of Food and Agriculture* 32 (5) 513-520 (1981) [10 ref. En] [Torry Res. Sta., Min. of Agric., Fisheries & Food, 135 Abbey Road, Aberdeen AB9 8DG, UK]

The Normal approximation to the binomial distribution is used to obtain confidence limits for the proportion of correct responses in a simple sensory difference test and the proportion of assessors able to discriminate between 2 products. Improved approximations, which should be considered with small panels or when the proportion of correct responses is close to 0 or 1, are discussed. To permit comparison of the discriminating ability of different panels, or investigation of the effect of a change in the products assessed, tests of the significance of the difference between 2 proportions are presented, based on the Normal approximation and the  $X^2$  statistic. The methods are illustrated with some data from an investigation on fish flavour. AS

## 60

### Sensory evaluation of dairy products.

International Dairy Federation

*International IDF Standard 99:1981*, 8pp. (1981) [En] [Square Vergote 41, 1040 Brussels, Belgium]

Part I of this standard is a recommended code of general practice for sensory grading of dairy products, listing min. requirements to be followed in production or trade. Part II is a guide for the sensory evaluation of butter; it includes an international table of defects in the appearance, consistency and flavour of butter, giving designations of defects in English, French and German, together with a table of directions for scoring of butter (this table was inadvertently omitted from the original version, *IDF Standard 99:1980*, which the present edition supersedes). Part III is a similar guide for the sensory evaluation of dried milk. A further part, on sensory grading of cheese, is in preparation. ADL

## 61

### [Sensory evaluation of butter.]

Bernotene, O. P.; Grinene, E. K.; Ignatavichene, R. B.; Rekshtene, A. A.; Lyubinskene, Ya. S.

*Molochnaya Promyshlennost'* No. 10, 26-29 (1980) [4 ref. Ru] [Kaunasskii Politekh. Inst. im. Antanasa Snehkusa, Kaunas, USSR]

The 100-point scale prescribed for butter grading in a proposed new version of *Soviet Standard GOST 37-55* is compared with the 5-point scale recommended by IDF [see preceding abstr.]. Under GOST 37-55 there is a max. score of 50 for taste and odour, 25 for consistency, working and appearance, 5 for colour, 10

for salting and 10 for packaging. An aggregate score of  $\geq 88$  is needed for top grade and of  $\geq 80$  for 1st grade. It is pointed out that the IDF procedure is much simpler than the Soviet one, facilitates the introduction of a uniform evaluation system for all dairy products, and has several other advantages. Adoption of the IDF recommendations (with which the USSR National Dairy Committee expressed agreement in principle several years ago) is strongly advocated. ADL

## 62

### Guidelines for the preparation and review of papers reporting sensory evaluation data.

United States of America, Institute of Food Technologists, Sensory Evaluation Division

*Food Technology* 35 (4) 16-17 (1981) [7 ref. En]

These guidelines, prepared by the Sensory Evaluation Division of the Institute of Food Technologists, are intended for use by authors in preparing research papers which include sensory evaluation data and also for use by reviewers in evaluating the suitability of such papers for publication. The guidelines are detailed in a table under the headings: abstract, introduction, experimental method, results and discussion and references. They can be used as a checklist of information that should be included in the paper. JA

## 63

### [Sensory analysis and control of food quality.

#### I. Introduction.]

Costell, E.; Duran, L.

*Revista de Agroquímica y Tecnología de Alimentos* 21 (1) 1-10 (1981) [34 ref. Es] [Inst. de Agroquímica y Tecnología de Alimentos, Valencia, Spain]

## 64

### [Studies on the production of elderberry wine.]

No, H. K.; Kim, D. S.; Yu, T.-J.

*Korean Journal of Food Science and Technology* 12 (4) 242-253 (1980) [22 ref. Ko, en] [Dep. of Food Tech., Korea Univ., Seoul 132, S. Korea]

Potential for fermentation of elderberries to make wine was studied. The berries contained 82.8% moisture, 0.82% fat, 3.73% protein and 0.83% ash; resultant juice from frozen berries (at a 61.4% extraction rate) was 9.2% sugar, 0.62% total acidity (as tartaric acid) and pH 4.46. *Saccharomyces cerevisiae* var. *ellipsoideus* was a more suitable yeast for winemaking than *S. cerevisiae* var. *Montrachet*, and it produced better wine from frozen than from dried fruit. Although pressing time did not seem to influence chemical quality of the wine, fruit pressed on the 3rd day was preferred by a taste panel. Gas chromatography was used to determine organic acids; citric acid predominated in frozen fruit, and lactic acid in dried fruit and wines. [From En summ.] LH



65

The words used to describe abnormal appearance, odor, taste, and tactile sensations of wines. (In 'The analysis and control of less desirable flavors in foods and beverages' [see FSTA (1981) 13 12G820]) [Lecture] Amerine, M. A.

pp. 319-351 (1980) [46 ref. En] [Dep. of Viticulture & Enology, Univ. of California, Davis, California, USA]

This chapter comprises a comprehensive unique compilation, source material, and discussion of the vocabulary used in the USA to describe abnormal sensory sensations in wine. Definitions are given alphabetically of words used to describe undesirable appearance, tastes, odours, tactile, or difficult to classify sensory sensations. AL

66

The significance of sensory tests for the baking- and confectionery industry.

Seibel, W.

*CCB Review for Chocolate, Confectionery and Bakery* 6 (1) 10-11 (1981) [En]

The development of sensory analysis of foods to give objective results is described. As for chemical analysis, this requires training facilities to provide skilled personnel to apply special techniques and evaluate the results. In the German baked confectionery industry, sensory observations usually cover smell, taste, colour and tactile impression. Intensive training facilities remain limited, but are being introduced for bread and special bakery products, covering ranking tests, triangular tests and descriptive quality evaluation. Preference tests carried out by untrained people are also discussed. These may be distorted by unusual individual tastes, and by individuals accustomed to an inferior product which is regarded as normal. Reproducibility is often poor and results may not agree with sensory analysis. Successful applications of sensory analysis are mentioned, including: direct evaluation of raw materials and finished products, identification of specific effects of individual components, flavour research, storage tests (e.g. biscuits), and marketing problems (e.g. deviations desired by a particular population or arising from fashion changes). ELC

67

[Trappist cheese. II. Organoleptic quality.]

Sabados, D.; Rajsic, B.

*Mljekarstvo* 30 (11) 323-330 (1980) [22 ref. Sh] [Zavod za Mljekarstvo, Zagreb, Yugoslavia]

Results of organoleptic evaluation of 33-42 Trappist cheese samples obtained monthly on the Zagreb market in 1978, and of 92 in 1979 are presented. Data on external appearance, colour, body, cut surface, aroma, taste, total score on a 20-point scale, and on cheese grading are tabulated; these assessments are compared with those for 134 Trappist cheeses [see FSTA (1977) 9 2P416] and for 629 Yugoslav cheeses evaluated in 1965-1975 [see FSTA (1976) 8 11P2157]. In 1978 or 1979, there were no extra quality Trappist cheeses; 14.3 and 5.4% resp. of the cheeses were 1st quality in the 2 yr, 35.7 and 52.2% were 2nd quality, 33.3 and 35.9% were 3rd quality and 16.7 and 6.5% were substandard. The variable quality of 1978 and 1979 cheeses and the small proportion of high quality cheeses are emphasized. Photographs of cut 1979 cheeses and of a 1957 cheese

68

Chemical and organoleptic characterization of flavor changes during storage of hard-cooked egg albumen and yolk.

Verstrate, J. A.

*Dissertation Abstracts International, B* 41 (6) 2108:

Order no. 8025967, 132pp. (1980) [En] [Washington State Univ., Pullman, Washington 99163, USA]

Sensory analyses were used to describe the flavour changes in albumen, yolk and whole egg of peeled hard boiled eggs stored at 2°C. Triangle tests showed flavour changes were more easily discernible in albumen than whole egg and yolk and after 1 week storage at 2°C. Quantitative Descriptive Analysis (QDA) showed a decrease in 'sulphury' and an increase in 'NH<sub>3</sub>' aroma and flavour of albumen. Chemical analyses showed that the H<sub>2</sub>S content of albumen decreased from 16.6 µg/g of fresh cooked albumen to <0.5 µg/g of albumen stored for 1 week at 2°C. NH<sub>3</sub> average content of 4.7 µg/g of fresh cooked albumen did not change significantly during storage. QDA panel scores showed the major flavour differences taking place during storage of yolk to be an increase in 'wet feather' aroma and stale, 'cardboardy' flavour; the 'sulphury' aroma note was prominent but changed only slightly during storage. NH<sub>3</sub> concn. was higher in yolk than albumen but was not detected by the QDA panel in aroma or flavour; H<sub>2</sub>S concn. was 0.84 µg/g yolk. Gas chromatography-MS analysis identified 9 volatile components from hard-boiled albumen. All compounds identified in volatiles of albumen were also present in yolk volatiles. SP

69

Method of test for canned food (test for flavour and odour).

Taiwan, National Bureau of Standards

*Chinese National Standard CNS N6022*, 2pp. (1978)

[En]





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H. BROOKES

EDITOR





## 1

**Objective quality rating of Pinotage wine.**

Marais, J.; Rooyen, P. C. van; Plessis, C. S. du  
*Vitis* 18 (1) 31-39 (1979) [20 ref. En, de] [Oenological & Viticultural Res. Inst., Private Bag X5026, Stellenbosch, South Africa]

Contents of 6 fatty acid esters were measured by GLC in 17 dry red wines made from Pinotage cv. grapes. Wine quality was assessed by a taste panel to give 3 quality factors: overall quality, aroma and taste. A least squares curve fitting computer program was used to identify equations based on ester concn. that could be used to predict wine quality. Concn. of n-hexyl acetate and ethyl octanoate, when incorporated into multiple regression equations, were the most important independent variables for good predictions of all 3 facets of wine quality. Whether these compounds act directly on wine quality, or as indices of other compounds that act directly was not investigated. For the wines studied, which were all made under standard conditions using grapes from a single vineyard, quality rating has a complex non-linear relationship with at least 3 independent variables. DIH

## 2

A survey of quality factors found in Florida canned single-strength grapefruit juice from the 1977-78, 1978-79, and 1979-80 seasons.

Rouseff, R. L.; Barros, S. M.; Dougherty, M. H.; Martin, S. F.

*Proceedings of the Florida State Horticultural Society* 93, 286-289 (1980) [6 ref. En] [Florida Dep. of Citrus, Agric. Res. & Education Cent., PO Box 1088, Lake Alfred, Florida 33850, USA]

A consistent inverse relationship between bitterness and flavour was observed during a survey of canned single-strength grapefruit juice from 1977-1978 to 1979-1980. During a typical season bitterness decreased, flavour increased, limonin decreased and naringin increased with fruit maturity. Highest average flavour score was observed during the 1978-1979 season. This season had the lowest bitterness score, the highest Brix/acid ratio and the lowest concn. of limonin and naringin. 4 of the 11 participating plants had below average flavour scores. Each of these plants also had above average bitterness, above average limonin, below average ratio and above average acid. Only 2 of the 4 plants had above average naringin. AS

## 3

**Sensory evaluation of drinking water by consumer panels.** [Lecture]

Köster, E. P.; Zoeteman, B. C. J.; Piet, G. J.; Greef, E. de; Oers, H. van; Heijden, B. G. van der; Veer, A. J. van der  
*Science of the Total Environment* 18, 155-166 (1981) [11 ref. En] [Psychological Lab., Utrecht Univ., Utrecht, Netherlands]

2 randomly-selected, inexperienced sensory panels were obtained from Kralingen and Berenplaat (areas of Rotterdam) (117 and 129 people in the panels), and asked to assess their tap water for taste in a weekly investigation, on a 1-5 scale where 1 = tastes good and 5 = tastes bad. Expert panels also judged water from the 2 plants in the laboratory using the same scale.

30 wk of the study were evaluated. The average scale value of Kralingen water in the tap study was 0.8, and that of the Berenplaat water 1.0. This difference is significant, as both plants receive the same raw material, so treatment in Berenplaat may need improvement. This study is continuing. [See FSTA (1982) 14 1H5.] LH

## 4

**[Application of the profile method to sensory evaluation of foods, using blackcurrant nectar as an example.]** Anwendung der bewertenden Profilmethode zur sensorischen Qualitätsbeurteilung von Lebensmitteln, dargestellt am Beispiel von Nektaren aus schwarzen Johannisbeeren.

Molnar, P.

*Lebensmittelindustrie* 27 (12) 549-554 (1980) [29 ref. De, en, ru, fr] [Cent. for Food Inspection & Res., Budapest, Hungary]

Basic principles of profile analysis and its use for quantitative evaluation of the sensory properties of foods are discussed. As an example, application of the method to blackcurrant nectars is described; parameters considered include aroma, characteristic flavour, aftertaste and 'harmony' of sensory characteristics. Weighting factors for the individual parameters are given. Results of use of profile analysis for evaluation of changes in the sensory properties of blackcurrant nectar during storage in a refrigerator or under ambient conditions are presented diagrammatically; refrigerated storage gave markedly better quality retention. AJDW

## 5

**Quality evaluation of raw tuna by gas chromatography and sensory methods.**

Human, J.; Khayat, A.

*Journal of Food Science* 46 (3) 868-873, 879 (1981) [35 ref. En] [Van Camp Sea Food Co., Res. Cent., 4245 Sorrento Valley Boulevard, San Diego, California 92121, USA]

5 components of the volatile profile of tuna, obtained by GLC, showed a significant correlation to the raw tuna quality evaluated organoleptically. A chemical quality index (Q.I.) was developed on commercially available tuna using the concn. of 5 components: ethanol, propanol, butanol, hexanal, and 1-pentene-3-ol. Quality designation of raw tuna using the Q.I. index resulted in a more accurate classification than the organoleptic method. IFT

## 6

**Cooking at variable microwave power levels.**

Drew, F.; Rhee, K. S.; Carpenter, Z. L.

*Journal of the American Dietetic Association* 77 (4) 455-459 (1980) [25 ref. En] [Consumer Res. Cent., Texas Agric. Exp. Sta., Texas A&M Univ., College Station, Texas 77843, USA]

Comparisons were made of the effects of cooking top round beef roasts from the frozen and thawed states, in a countertop microwave oven at cooking powers of (i) high (553 W) and (ii) simmer (237 W), and (iii) in the upper oven of an electric double oven cooker at a temp. of 325°F (163°C), on the energy consumption, cooking



times, cooking losses and palatability. Cooking by (ii) rather than (i) almost doubled cooking time for thawed roasts, but did not increase the time significantly for roasts cooked from the frozen state. Cooking the roasts in the microwave oven required significantly less than cooking by (iii). Energy consumed to cook roasts by (i) or (ii) was not significantly different when the meat was cooked from either the thawed or frozen state. Cooking roasts from the frozen state required 40% more fuel by either (i) or (ii), and about 30% more with (iii). Total cooking losses ranged from 35–40%, the highest % being lost with (i) and the lowest with (iii). Taste panel evaluations showed no significant differences in palatability of thawed roasts cooked by (i), (ii) or (iii). When cooking started from the frozen state, roasts cooked by (ii) were comparable to (iii) in sensory quality. Roasts cooked from the frozen state by (i) had significantly lower palatability scores (except flavour scores) and higher shear values than did roasts cooked by (ii) and (iii). VJG

## 7

### Meat for keeps.

Niemand, J. G.

*South African Food Review* 8 (2) 35, 37, 39, 41 (1981) [En]

Radurization (extending shelf-life at refrigeration temp. using radiation), radappertization (sterilizing a product, giving an indefinite shelf-life at room temp.), and radicidation (inactivating pathogenic microorganisms), using radiation, on poultry, red meats, minced beef, offal and beef cuts, are described. Organoleptic evaluation of radurized products indicated that a > 2 fold increase in shelf-life can be obtained by this means. Tapeworm cysticerci (from *Taenia solium* and *T. saginata*) are inactivated in meat by low-dose irradiation. Radiation processing of food has been proven to be a safe method, with no harmful residual effects, and growth in popularity of its use is expected. LH

## 8

[The reliability of sensory analyses. II. Evaluation of the performance of individual panellists.] Zur Vertrauenswürdigkeit sensorischer Analysenergebnisse. Ermittlung der Urteilstreue einzelner Gutachter. Neumann, R.; Eckert, B.

*Lebensmittelindustrie* 28 (1) 7–11 (1981) [3 ref. De, en, ru, fr] [Fachabteilung Nahrungsgüter, Amt für Standardisierung, Messewesen & Warenprüfung, Berlin]

See FSTA (1980) 12 3A142 for part I.

## 9

[Sensory analysis and quality control of foods. II. Planning and execution: selection of tests.]

Costell, E.; Duran, L.

*Revista de Agroquímica y Tecnología de Alimentos* 21 (2) 149–166 (1981) [48 ref. Es] [Inst. de Agroquímica y Tecnología de Alimentos, Valencia, Spain]

The general methodology for sensory analysis of foods is summarized in a diagram. Brief outlines are given of the planning and selection of tests (discriminating, descriptive, preference/acceptability) including their aims, scales and applications. [See FSTA (1981) 13 12A757 for part I.] RM

## 10

[Examples for the solution of aroma problems using sensory profile methods.] Beispiele für die Lösung von Aromaproblemen mittels sensorischer Profilmethoden. Rothe, M.; Engst, W.; Specht, M.

*Chemie Mikrobiologie Technologie der Lebensmittel* 7 (1) 1–8 (1981) [17 ref. De] [Zentralinst. für Ernährung, Potsdam-Rehbrücke, German Democratic Republic]

Analysis of aromas in foods by profile analysis is discussed, with sections on the classification of sensory profile analysis, performance of profile analyses, presentation of results and areas of application, e.g. aroma problems in cheese, effect of temp. on the sensory profile of meat-type Maillard products, effect of raw material addition on sensory profile of meat broths, and effect of malt flour additions on sensory profile of rye bread. RAW

## 11

[Sensory evaluation of bread flavour.]

Auerman, L. Ya.; Enikeeva, N. G.; Pochevskaya, L. A.; Grishina, L. A.

*Khlebopekarnaya i Konditerskaya Promyshlennost'* No. 1, 27–28 (1980) [Ru] [Moskovskii Tekh. Inst. Pishchevoi Promyshlennosti, Moscow, USSR]

A method is described for establishing individual taste thresholds, based on the so-called min. variations method [see K. B. Bardin (1976) *Problema Porogov Chuvstvitel'nosti i Psikhofizicheskie Metody* [Problem of sensitivity thresholds and psycho-physical methods], Moscow]. Data are given on the sensitivity thresholds for 100 ml basic solutions of 0.0095 g tartaric acid, 0.270 g sucrose and 0.030 g salt. STI

## 12

Evidence for a constant number of available sweet receptor sites at threshold concentrations of sugars. Birch, G. G.; Munton, S. L.

*Experientia* 37 (8) 839–840 (1981) [9 ref. En] [Nat. Coll. of Food Tech., Univ. of Reading, St. Georges Avenue, Weybridge, Surrey KT13 ODE, UK]

Time/subjective intensity of sweeteners plots of solutions of a number of sweet-tasting molecules were obtained at 5–20 × threshold concn. for each compound. Taste panellists recorded intensity (on a scale of 1–100) by controlling a potentiometer on a chart recorder. If it is assumed that subjective intensity  $R$  obeys an equation of the type  $R = kc^n$ , where  $k$  is a constant for any 1 molecule,  $c$  = concn. and  $n$  the taste exponent, then a plot of  $\log R$  vs.  $\log c$  gives a line of intercept  $\log k$  and slope  $n$ . Values of  $k$  were obtained by this means for 9 sugars and sugar alcohols and are tabulated as 'accession efficiencies' (the fraction of molecules that actually accede to their taste receptor). The product of accession efficiency and threshold concn. is also tabulated as an assumed measure of number of molecules of a compound acceding to receptors at the threshold concn.; structurally related compounds have very similar values, and it is concluded that a constant number of receptors is available for a family of structures. 'Affinities' of sugars for their receptors were obtained by plotting max. intensity/time to max. intensity as 'velocity' in a Lineweaver-Burke-type plot for the 4 concn. used for each molecule.



Results are tabulated as ' $K_m$ ' values; these values parallel threshold concn., i.e. sucrose has the lowest threshold concn. of the sugars studied, and the lowest ' $K_m$ ' for the receptor. DIH

### 13

[Organoleptic quality and sensory evaluation of foods.] Genuswert und sensorische Prüfung von Lebensmitteln.

Pauli, H.

*Verbraucherdienst* 26 (6) 130-137 (1981) [5 ref. De] [Stationweg 101, 5303 Bornheim, Federal Republic of Germany]

Aspects considered include: classification of quality characteristics of foods; sensory quality and its importance; general aspects of sensory evaluation; applications of sensory evaluation; standards for sensory evaluation in the Federal Republic of Germany; and definition of terms. AJDW

### 14

[Sensory evaluation of food. Practical textbook.] Sensorische Lebensmittel-Prüfung. Lehrbuch für die Praxis. [Book]

Jellinek, G.

xxiv + 585pp. ISBN 3-9800422-1-9 (1981) [many ref. De, en] Pattensen, Federal Republic of Germany; Verlag Doris & Peter Siegfried

This practical textbook of sensory evaluation of foods includes the following chapters: General introduction to sensory analysis (pp. 1-6, 4 ref.); General testing conditions, (pp. 7-22, 7 ref.); Programme for a course (pp. 23-25); Taste (pp. 26-58, 7 ref.). Odour (pp. 59-117, 47 ref.); Aroma (pp. 118-164, 28 ref.); Further senses (pp. 165-183, 5 ref.); Definition of texture and flavour (pp. 184-192, 22 ref.). Threshold tests with substances of the 4 basic tastes (pp. 193-223, 27 ref.); Difference tests (pp. 225-347, 35 ref.); Ranking tests (pp. 348-382, 6 ref.); Flavour profile and dilution flavour profile analysis (pp. 383-420, 8 ref.); Special explanations (benzo[a] pyrene hydroxylase, AHH) activity in rat Organization of a complete course (pp. 475-522); and Selection of taste panellists (pp. 523-535, 2 ref.). A 7-pp. index of authors of references, a 19-pp. De subject index and an 18-pp. En subject index are included. AJDW

### 15

[Basis for the sensory examination of fruit juices.]

Grundlagen für das sensorische Prüfen von Fruchtsäften.

Weber, A.

*Flüssiges Obst* 48 (6) 272, 274-275, 278-280 (1981) [8 ref. De, en, fr] [Deutsche Landwirtschafts-Gesellschaft, Zimmerweg 16, D-6000 Frankfurt am Main, Federal Republic of Germany].

The basis for sensory examination of fruit juices and qualifications for the DLG (Deutsche Landwirtschafts-Gesellschaft) examiner's certificate are surveyed. The DLG quality tests use 5-point scales for sensory analysis under standard conditions and according to objective criteria. RM

### 16

Sensory methodology for food: comparison of (1) statistical designs, (2) panel training and experience, and (3) evaluation techniques.

Chambers, E., IV

*Dissertation Abstracts International*, B 41 (12) 4439-4440 Order no. 8111813, 59pp. (1981) [En] [Kansas State Univ., Manhattan, Kansas 66506, USA]

### 17

Better reports of sensory evaluation.

Larmond, E.

*Technical Quarterly, Master Brewers' Association of the Americas* 18 (1) 7-10 (1981) [6 ref. En] [Food Res. Inst., Agric. Canada, Ottawa, Ontario, Canada]

Design of sensory testing procedures is described, with reference to panelist selection, sensory method selection, testing conditions and report format. Factors which affect the reliability and validity of the results are particularly emphasized. [See FSTA (1982) 14 4H540.] JRR

### 18

Sharper methods of sensory analysis.

Sidel, J. L.; Stone, H.; Bloomquist, J.

*Technical Quarterly, Master Brewers' Association of the Americas* 18 (1) 3-6 (1981) [15 ref. En, es] [Tragon Corp., Palo Alto, California, USA]

Recent advances in sensory analysis provide researchers with more reliable tests. Interval and ratio scaling techniques represent recent adaptations to sensory analysis of information from psychophysics. The application of improved methods of sensory analysis with emphasis on their integration into a modern brewery is discussed. [See FSTA (1982) 14 4H540.] JRR

### 19

The importance of flavour in brown sugar for consumer goods application. [Lecture]

Christianson, G.; Anhaiser, L.

*Publications of Technical Papers and Proceedings of the Annual Meeting, Sugar Industry Technologists* 39, 177-185 (1980) [En]

Flavour governs the acceptability of brown sugar to both the domestic consumer and the industrial consumer, since the flavour of products depends on that of the raw material; it is thus the most valid basis for evaluation of brown sugar quality. Samples for flavour evaluation should be converted to fondant, to eliminate the effects of texture and mouthfeel; a standard procedure is given. Adequate description of the flavour desired by a consumer can permit a refinery to 'tailor' its product accordingly. Process alterations are made on a 'trial and error' basis while samples from points throughout the process are taste-monitored, until experience is gained in promoting desirable flavour components and reducing unwanted ones; a simple system of monitoring flavour at 'key' points can be evolved to standardize and accentuate desirable flavours. A demonstration is reported, involving 4 samples with described taste profiles. [See FSTA (1982) 14 4L239.] MEC



## 20

Statistical designs and panel training/experience for sensory analysis.

Chambers, E., IV; Bowers, J. A.; Dayton, A. D.  
*Journal of Food Science* 46 (6) 1902-1906 (1981) [En]  
[Dep. of Foods & Nutr., Kansas State Univ., Manhattan,  
Kansas 66506, USA]

Samples from 6 experimental treatments (in a factorial arrangement) were presented to a 3-member, trained-experienced panel and an 8-member semi-trained panel in either a randomized complete block design or a balanced incomplete block (BIB) design. The experiment was repeated 3 times using chicken, turkey, and poultry frankfurters representing 3 levels of variation in experimental units. Flavour and textural characteristics were evaluated. Neither design was consistently more advantageous than the other; however, residual error mean squares for textural characteristics scored by the trained-experienced panel were lower for the BIB design. The trained-experienced panel had lower residual error mean squares than did the semi-trained panel. IFT

## 21

Relationships between sensory crispness and other sensory and instrumental parameters.

Vickers, Z. M.; Christensen, C. M.  
*Journal of Texture Studies* 11 (3) 291-307 (1980)  
[17 ref. En] [Dep. of Food Sci. & Nutr., Univ. of  
Minnesota, St. Paul, Minnesota 55108, USA]

20 subjects judged the crispness, loudness, and firmness of 16 food samples by both biting and chewing and by only biting the foods. These subjects also scored the foods for 13 textural qualities. Instrumental measures of slope, peak force, and deformation to fracture were obtained for the 16 foods from a snap test at 4 deformation rates. Whether a subject judged an attribute by the bite or the bite and chew technique made little or no difference in the sensory judgments. Crispness appeared to be very closely related to loudness and less closely related to firmness. Loudness of the chewing sounds was more closely related to crispness than to firmness. Of the sensory qualities studied, loud, snap, and crackly were the 3 most closely related to crispness. Of the instrumental parameters Young's Modulus generally had the highest correlation with the crispness of all foods and peak force generally had the highest correlation with firmness. Deformation rate had minimal effects on measures of flexure or peak force, but its effects on Young's Modulus were frequently large and irregular. A vibrotactile-acoustical hypothesis for crispness is proposed. AS

## 22

[Reliability of organoleptic tests.]

Zukal, E.; Szabolcs, L.; Racz, E.  
*Élelmiszervizsgálati Közlemények* 26 (4/5) 195-208  
(1980) [3 ref. Hu] [Agrartudományi Egyetem,  
Mosonmagyaróvár, Hungary]

Studies on the reliability of sensory testing and the ability of panellists to differentiate various flavours, aromas, colours and tastes are described. Numerous tables of data are given, and problems with sensory assessment are considered. Difficulties included differentiation of flavours of butyric acid and diacetyl, of aromas of acetic and butyric acids, of shades of green and yellow, and of degrees of sweet and bitter tastes. AJDW

## 23

Comparison of the efficiency of triangle and tetrad tests for discrimination sensory analysis of food.

Pokorný, J.; Marcin, A.; Davidek, J.  
*Nahrung* 25 (6) 561-564 (1981) [7 ref. En, de, ru] [Dep.  
of Food Chem., Prague Inst. of Chem. Tech., Prague,  
Czechoslovakia]

The tetrad test, proposed by Renner and Römer [FSTA (1973) 5 8A394] was compared with the traditional triangle test; test foods included fruit juices, roasted groundnuts, meat broth, and spirits. The tetrad test was preferred to the triangle test, fewer tests being required to give a statistically-significant result. The tetrad test may be used by either trained or untrained personnel. IN

## 24

[Taste perception in young children.]

Geschmacksempfindungen bei Kindern jüngerer Alters.  
Marktl, W.

*Ernährung* 5 (1) 18 (1981) [1 ref. De] [Inst. Med. Fak.,  
A-1090 Vienna, Austria]

In trials to assess the taste perception of young children 30 children were selected from kindergarten and classes I-III in school and their taste perception compared with that of 4 adult women. Basis solutions (100%) and 0.1-40% dilutions of 8 spices were used; coloured water (to resemble the spice solutions) served as controls. Results show no differences in taste perception between age and sex groups. Generally, good differentiation between the spices was observed; results were similar for all spice solution concn. The method is considered to be useful and reliable. RAW

## 25

Sensory assessment of water quality. [Book]

Zoeteman, B. C. J.  
xiv + 148pp. ISBN 0-08-023848-3 (1980) [En] Oxford,  
UK; Pergamon Press. Price £14.24; \$33.00 [Nat. Inst. for  
Water Supply, Netherlands]

The main purpose of the study presented was to investigate the suitability of the sensory assessment of water quality as an indicator for the presence of chemical contaminants in drinking water and for potential health effects on consumers. Chapters are: Sensory assessment of drinking water quality by the population of the Netherlands (pp. 19-33); Sensory assessment of 20 types of drinking water by a selected panel (pp. 35-53); Drinking water taste and inorganic constituents (pp. 55-65); Drinking water taste and organic constituents (pp. 67-81); Sensory assessment of drinking water quality and health protection aspects (pp. 83-91); Further study and application of water quality assessment (pp. 93-111). A summary, 4-pp. subject index, 7-pp. bibliography and several appendices are also provided. LH

## 26

Report of the technical subcommittee on sensory analysis. [Lecture]

Meilgaard, M. C. (Chairman)  
*Journal of the American Society of Brewing Chemists*  
38 (3) 99-107 (1980) [16 ref. En]

Although 21 flavour reference standards are now available, it is considered that certain key flavour terms still require standardization. It has been determined that the original Paired Comparison test is unsuitable for



-detecting a flavour difference between 2 samples. 2 different forms of the test are now recommended: the Directional Difference test and the Paired Preference test. The Ascending Method of Limits (American Society for Testing and Materials E679-79) is the recommended method for determining the threshold of added substances. The Draft Method 3972 of the International Standards Organization is considered only to be applicable in certain well-defined conditions. Details of the Paired Comparison test and the threshold test are presented in 2 appendices. [See FSTA (1982) 14 5H699.] JRR

## 27

[Preference for Satsuma mandarin beverages.] Sugawara, T.; Matsumoto, N.; Aoyagi, Y.; Sasaki, H.; Nitta, K. *Journal of Japanese Society of Food Science and Technology [Nippon Shokuhin Kogyo Gakkaishi]* 26 (12) 530-537 (1979) [2 ref. Ja, en] [Kagawa Nutr. Coll., Tushima-ku, Tokyo, Japan]

Organoleptic analysis was used to assess the preference for different levels of acidity, sugar content, sugar:acid ratio and juice concn. in beverages prepared from satsuma mandarin (*Citrus unshiu*) juice. The beverages were prepared by mixing together different amounts of citric acid, sucrose and dil. juice. The overall quality, sweetness, sourness and sweet-sour balance of the beverages were rated on a 7-point scale by 20 taste panels. For beverages containing 10% juice, the panellists preferred acidities of 0.75, 0.65 and 0.55% and Brix values of 14 and 13. For beverages containing 50% juice, the preference was for acidities of 0.65, 0.55 and 0.45 and Brix values of 14, 13 and 12. Sourness was found to increase with increasing citric acid concn., this effect being more pronounced with 10% juice than with 50% juice. The sugar:acid ratio seemed to have no effect on preference. With beverages having identical acidities and sugar contents, the preference was for those having higher juice concn. [From En summ.] JA

## 28

### Sensory analysis - Methodology - Paired comparison test.

International Organization for Standardization *International Standard ISO 5495-1981*, 7 pp. (1981) [En]

A technique is specified for detecting differences in organoleptic attributes of 2 products. The paired comparison test may be used for the following purposes: directional differences; preference; and training of assessors. The standard covers apparatus, test conditions, procedure, expression and interpretation of results, and test report. A table lists, for 3 levels of significance, the min. number of positive replies needed in a unilateral test, and the min. number of replies citing 1 sample as needed in a bilateral test. Specimen answer forms are shown. AL

## 29

### Sensory analysis - Vocabulary.

International Organization for Standardization *International Standard ISO 5492/4-1981 (E/F)*, 4 pp. (1981) [En, Fr]

An additional 16 terms relating to sensory analysis are defined. En and Fr indexes to all terms so far covered in the standard are given. AL

## 30

Expanded tables for conversion of a proportion of correct responses ( $P_c$ ) to the measure of sensory difference ( $d'$ ) for the triangular method and the 3-alternative forced choice procedure.

Frijters, J. E. R.

*Journal of Food Science* 47 (1) 139-143 (1982) [En] [Dep. of Human Nutr., Agric. Univ., De Dreijen 12, 6703 BC Wageningen, Netherlands]

## 31

Can shelf life be measured? [Lecture]

McBride, R. L.

*CSIRO Food Research Quarterly* 40 (3/4) 149-152 (1980) [11 ref. En] [CSIRO Div. of Food Res., North Ryde, NSW, Australia]

This article considers the precise specification of shelf life based on sensory methods to be an unrealistic aspiration. It considers the failure of the traditional sensory approach to the measurement of shelf-life. Consideration is given to the measurement of the acceptability response i.e. the degree to which a food is liked or disliked. A sensory method for determining shelf-life is proposed which instead of required respondents to make side-by-side assessments of acceptability, restricts each respondent to the evaluation of a single sample. An empirical example is given involving the shelf life of 2 quality grades of sultanas. [See FSTA (1982) 14 6E226.] VJG

## 32

[The Apple II Plus data system for sensory analysis of foods.]

Tenningen, A.; Olstad, S.; Rodbotten, M.

*NINF Informasjon* No. 4, 233-236 (1981) [1 ref. No]

## 33

Overview: Consumer sensory testing sequence in product development and optimization. [Conference proceedings]

Dethmers, A. E.; Preziosi, K. (United States of America, Institute of Food Technologists) (Chairmen) *Food Technology* 35 (11) 64-76 (1981) [9 ref. En]

5 papers are published that were presented at a symposium held during the 41st Annual Meeting of the Institute of Food Technologists, Atlanta, Georgia, 7-10 June 1981. These papers have the following titles. Sensory discovery, sensory scale-up and sensory cycles, by E. E. Schaefer (pp. 65-66, 69). In-house preference testing: An R&D resource, by L. H. Radtke & N. C. Rodriguez (pp. 67-69, 9 ref.). Focus groups: letting consumers think about your new product idea, by L. Kraft (pp. 70-72). The laboratory test market: an approach to estimating product potential, by S. Rose (pp. 73-74). Use of market research in the food industry, by D. K. Hardin (pp. 75-76). DIH



## 34

[Correlation between sensory and instrumental texture determinations on selected foods.]

Korrelation zwischen sensorisch und instrumental ermittelten Texturdaten an ausgewählten Lebensmitteln. [Review]

List, D.; Emscher-Mann, B.

*Gordian* 81 (9) 189-190, 192-193; (10) 231-234 (1981)

[32 ref. De] [Tech. Univ. Berlin, Inst. für

Lebensmitteltech., Federal Republic of Germany]

This review discusses the importance of texture in quality evaluation of foods; sensory and instrumental methods of texture detn., and their applications (e.g. to determine the optimum degree of maturity for harvesting legumes, or the optimum cooking time for vegetables, pasta or beef). Relations between the results obtained by an Instron Food Testing machine and by sensory evaluation are discussed. No standard scale of evaluation is available at present. RM

## 35

[Organoleptic evaluation of extrudates.] Sensorische Bewertung von Extruderprodukten.

Seiler, K.; Seibel, W.

*Getreide, Mehl und Brot* 34 (3) 81-84 (1980) [13 ref.

De] [Bundesforschungsanstalt für Getreide- &

Kartoffelverarbeitung, Postfach 23, 4930 Detmold,

Federal Republic of Germany]

A description is given of a 5-point evaluation system similar to that of the DLG system [see FSTA (1982) 14 6M741] based on 5 characteristics (e.g. appearance, consistency), each having a specific weighting factor. The system gave good results with some commercial extruded snack products (maize-cheese, maize-onion, potato) and some raw maize extrudates. HBr

## 36

[Considerations on changes in the scheme for sensory evaluation of wine.] Gedanken zu einer Änderung des Sinnenprüfungsschemas für Wein.

Grosser, H.-U.; Weber, A.

*Weinwirtschaft* 117 (29) 812, 817-820 (1981) [De]

The existing 20-point-scale German Agricultural Society scheme for evaluation of wine quality is critically discussed, with special reference to its lack of fine differentiation of quality, and insufficient consideration of the overall harmony, etc. of the wine. Advantages of a 5-point-scale scheme, as applied to various other foods, are considered. Suggestions for a scheme for wine are presented, with aroma, flavour and 'harmony' each being evaluated on a 5-point scale, award of half-points being possible. Selected weighting factors are then applied to scores awarded for each of these characteristics. Practical aspects of application of this system and interpretation of results are considered. AJDW

## 37

[New DLG test procedure for quality evaluation of bakery products.] Das neue DLG-Prüfschema für die Qualitätsbeurteilung von Backwaren.

Weber, A.; Seibel, W.

*Getreide, Mehl und Brot* 34 (3) 71-73 (1980) [De]

[Deutsche Landwirtschafts-Gesellschaft,

Zimmerweg 16, 6000 Frankfurt/Main, Federal Republic of Germany]

The Deutsche Landwirtschafts-Gesellschaft (DLG) has replaced the old 20-point evaluation system for a 5-point scheme (5 = very good, 1 = unsatisfactory), which is applied to 5 or 6 individual characteristics of the product, e.g. shape, porosity, elasticity and odour (there are slight differences for bread and for fine bakery products). Additionally, weighting factors to be taken into consideration are given. A typical example is given for bread, and the classification system for awarding prizes (5 = top prize, 4.00 = prize not awarded) is tabulated. [See FSTA (1982) 14 6G397.] HBr

## 38

[Modified QDA method for the sensory evaluation of bread.]

Filajdic, M.; Ritz, M.; Vojnovic, V.; Pavlek, J.

*Hrana i Ishrana* 22 (1/2) 29-32 (1981) [6 ref. Sh, en]

[Tehnoloski Fak., Zagreb, Yugoslavia]

A modified quantitative descriptive analysis (QDA) procedure is proposed to assess bread quality, the current Yugoslavian legislation for bread quality assessment being considered inefficient. Bread is to be assessed by 14 quality parameters, each parameter receiving a score of 1-5 (5 = excellent, 1 = unsatisfactory); these scores are then adjusted by appropriate weighting factors (0.2-0.8). The max. total is 30 points; bread receiving  $\leq 12$  points is not suitable for sale. IN

## 39

[Culinary products. Organoleptic and physical tests.]

Poland, Polski Komitet Normalizacji, Miar i Jakosci

*Polish Standard* PN-80/A-82101, 6pp. (1980) [Pl]

This standard, which supersedes PN-71/A-82101,

gives methods for testing the main sensory characteristics (appearance, odour, taste and consistency) of culinary products (not defined further), together with a 5-point evaluation system. HBr

## 40

[A comparison between the methods of ranking and analysis of variance for determination of the significance of sensory evaluation results.]

Chaves, J. B. P.; Coelho, D. T.; Pereira, A. S.; Oliveira, L. M. de

*Revista CERES* 27 (154) 561-572 (1980) [17 ref. Pt, en]

[Dep. de Tecnologia de Alimentos, Univ. Fed. de Vicosa, 36570 Vicosa, Minas Gerais, Brazil]

3 different food products were examined by taste panel, using hedonic and absolute scales for evaluation. Ranking method, analysis of variance and Tukey's test were employed to test for significant differences caused by 4 treatments. It was demonstrated that the ranking method could be substituted for the analysis of variance in statistical reduction of simple sensory scores, if the scoring from the scales is converted to rank numbers, without loss of sensitivity. [From En summ.] JRR



## 41

[Analysis of sensory data from foods by means of the range test.]

Chaves, J. B. P.; Coelho, D. T.; Pereira, A. S.; Martyn, M. E. L.

*Revista CERES* 27 (154) 573-585 (1980) [13 ref. Pt, en]  
[Dep. de Tecnologia de Alimentos, Univ. Fed. de Vicosa, 36570 Vicosa, Minas Gerais, Brazil]

Sensory evaluation data from several different food analysis experiments were analysed using the range method, Tukey's test and analysis of variance. The results were consistent for each of the methods, demonstrating that the range method can be used to analyse the significance of treatment differences in sensory data in simple experiments of one factor and small treatment numbers. [From En summ.] JRR

## 42

Sensory evaluation consulting group optimizes product, panel test techniques.

Anon.

*Food Product Development* 15 (1) 46-47 (1981) [En]

A description is given of the services of a consulting group specializing in sensory evaluation, called the Taste and Smell Consulting Group Inc. (TASC). TASC services fall into 4 basic areas: panel selection and training, test procedure optimization, panel upgrading and contract testing. TASC also processes data from sensory evaluations with techniques that can better analyse information and more accurately predict market acceptance. VJG

## 43

[A comparison between the Kruskal-Wallis test and ranking for determination of the significance of sensory evaluation results.]

Chaves, J. B. P.; Coelho, D. T.; Oliveira, L. M. de; Thiebaut, J. T. L.

*Revista CERES* 27 (154) 586-601 (1980) [14 ref. Pt, en]  
[Dep. de Tecnologia de Alimentos, Univ. Fed. de Vicosa, 36570 Vicosa, Minas Gerais, Brazil]

Sensory evaluation data from several different food analysis experiments were analysed using the Kruskal-Wallis test and the ranking sum method. The conclusions drawn from the 2 methods were consistent, and since the ranking sum method is quickly and easily done, it is recommended for similar applications. [From En summ.] JRR

## 44

[A comparison between the Kruskal Wallis and range methods for analysis of sensory data from foods.]

Chaves, J. B. P.; Pereira, A. S.; Oliveira, L. M. de; Martyn, M. E. L.

*Revista CERES* 27 (154) 602-614 (1980) [10 ref. Pt, en]  
[Dep. de Tecnologia de Alimentos, Univ. Fed. de Vicosa, 36570 Vicosa, Minas Gerais, Brazil]

Sensory evaluation data from several different food analysis experiments were analysed using the range

method and the Kruskal-Wallis test. The conclusions of each method were consistent with the other; it is concluded that the range method can be used to analyse the significance of treatment differences in sensory data in simple experiments of one factor and small treatment numbers. [From En summ.] JRR

## 45

[Sensory evaluation for measurement of food quality. II. Evaluation of quality by the Karlsruhe test.]

Witting de Penna, Q. F. E.

*Alimentos* 6 (1) 25-31 (1981) [8 ref. Es] [Dep. de Quimica y Tecnologia de los Alimentos, Univ. de Chile, Santiago, Chile]

The Karlsruhe test, in which food samples are awarded point scores on a defined 9-point scale for each of the characteristics studied, e.g. colour, shape, aroma, flavour, texture, is described. Practical aspects are considered, including selection of the scale, training

of a taste panel, number of samples, statistical evaluation of results, and applications. Examples are given of general scales for evaluation of foods, and scales designed for ham and for salmon. AJDW

## 46

Consumer Assessment of 'tenderstretched' loin steak. Ford, A. L.

*CSIRO Food Research Quarterly* 41 (1) 1-6 (1981)  
[9 ref. En] [CSIRO Div. of Food Res., Cannon Hill, Queensland, Australia]

This paper reports the results of a consumer comparison of conventional and tenderstretched (i.e. technique for reducing muscle shortening and consequent toughening of meat which can occur when carcasses or sides are cooled before rigor mortis sets in) loin steaks from steers reared in 3 different regions of New South Wales. The animals were slaughtered at 3 commercial abattoirs and steaks were obtained from the anterior and posterior ends of the striploin, and from the cube roll. The meat was assessed by 125 households in the Brisbane metropolitan area and the results were statistically analysed. Most cooks (79%) thawed the steaks before cooking. Frying (57%) and grilling (39%) were the most frequently used cooking techniques and well done (62%) and medium (32%) were the most common degrees of cooking. Tasters judged tenderstretched steaks significantly ( $P < 0.001$ ) more tender and juicy than the steaks from conventionally hung sides, and also awarded them higher scores for taste and overall acceptability. Differences between sample scores for the 3 different cuts used were nonsignificant. Mean scores for all attributes from slaughter 3 were significantly different from those for the first 2 slaughters. 75% of cooks were satisfied with tenderstretched samples, but only 55% were satisfied with conventional samples. This difference is statistically significant and shows that the improvement in meat tenderness produced by using the tenderstretched hanging technique is apparent in a real life situation. VJG



## 47

**Sensory profile of a Fernet aperitif.**

Pokorny, J.; Karnet, J.; Davidek, J.  
*Nahrung* 25 (6) 553-559 (1981) [22 ref. En, de, ru] [Dep. of Food Chem., Prague Inst. of Chem. Tech., Prague, Czechoslovakia]

Odour and flavour profiles of a Fernet aperitif were determined by a panel of 51 men and 65 women. Both groups performed similarly, but slightly different ratings of the intensities of various partial flavours were observed between the groups. No differences in accuracy were observed. In some cases aroma notes and their analogous flavour notes were rated differently. Correlations between intensities of various aroma and flavour notes were a good indication of differences between groups. Significance of various correlation coeff. often differed widely between groups. Results show moderate differences in odour and flavour perception by male and female taste panellists. IN

## 48

**Taste thresholds and hedonic responses of panels representing three nationalities.**

Druz, L. L.; Baldwin, R. E.  
*Journal of Food Science* 47 (2) 561-563, 569 (1982) [En] [Dep. of Food Sci. & Nutr., Univ. of Missouri, Columbia, Missouri 65211, USA]

Taste thresholds for NaCl, sucrose, citric acid and caffeine in aqueous solutions did not differ among panels from Nigeria, Korea, and the USA. The Nigerians and Koreans liked tomato juice more than the Americans, and preferred it sweetened. The Koreans liked apple sauce better than the other 2 nationalities, but did not differentiate among the sweetened apple sauce, that containing NaCl and the control. Americans liked the control, and Nigerians liked the sweetened apple sauce best. Frequency of consuming groups of foods by panelists was related to the trend toward liking tomato juice with sweet, sour, salty, and bitter, and apple sauce with sweet and salty taste substances added, but there was no significant relationship between hedonic responses and thresholds. IFT

## 49

**[Quality maintenance of red table wines.]**

Yakivchuk, A. P.

*Tovarovedenie* 14, 30-32 (1981) [3 ref. Ru]

Effects of environmental factors (light and temp.) on the storage ability of red wines were studied using Algerian, Cabernet and Saperavi wines. Wine quality was determined by contents of phenolic substances [PS], anthocyanins [AC] and by sensory score. To examine the effect of light, the wines were bottled in colourless, brown or green glass bottles and stored in the light or dark at 18-22°C for 3 months; PS and AC were determined in initial wines and at monthly intervals. To assess effects of temp., wines were stored, immediately on bottling, at 0-4°, 6-10°, 12-16° or 18-22°C for 4 months; In the light trials, PS content had decreased at the end of storage by 8-12% in dark-stored samples, and PS retention was only 10-22% in light-stored wines, colourless bottles giving least

retention, brown bottles the most; similarly AC content decreased by 5-7% (in darkness) and by 10-30% (in light). In the temp. trials, wines stored at 0-4°C had the highest PS and AC contents, although they became turbid after 3 months storage. For wines stored at 6-10°C and 12-16°C resp., after 4 months AC contents decreased by 9-13% and 15-24%, and PS decreased by 2-13% and 7-18%, resp. Algerian wine had a sensory score of 7.81 before storage and scores of 7.56 (at 6-10°C) and 6.01 (at 12-16°C) at end of storage. Storage in the dark at 6-10°C is recommended for red table wines. RAW

## 50

**Selection and training of panelists for sensory evaluation of meat flavours.**

Winger, R. J.; Pope, C. G.

*Journal of Food Technology* 16 (6) 661-669 (1981) [12 ref. En] [Meat Ind. Res. Inst. of NZ Inc., PO Box 617, Hamilton, New Zealand]

Despite the necessity to select panelists sensitive to flavour changes and rigorously train them for meat quality evaluations, there is no published methodology to achieve this aim. Meat off-flavours, notably rancidity are extremely complex. General methods already described for sensory evaluation of foods are inadequate to establish rigorous yet practical procedures for use in studies on meat quality. This paper summarizes the experiences and details the procedures developed for training panelists in the rancid flavour assessment of lamb. AS

## 51

**Instron measurements and sensory scores for texture of poultry meat and frankfurters.**

Prusa, K. J.; Bowers, J. A.; Chambers, E. IY

*Journal of Food Science* 47 (2) 653-654 (1982) [En] [Dep. of Food & Nutr., Kansas State Univ., Manhattan, Kansas 66506, USA]

The relationship of sensory scores and Instron measurements of poultry meat and frankfurters was studied. Chicken samples were separated by tensile grips; turkey samples were sheared with a Warner-Bratzler shear attachment and compressed with a simulated-molar attachment; and poultry frankfurters were tested with the Warner-Bratzler shear, puncture probe, and simulated-teeth attachments. Generally, for chicken higher correlation coeff. between sensory scores and Instron measurements resulted when baseline length and area measurements of curves were made than when peak height was measured. For turkey, Instron measurement with either the Warner-Bratzler shear or the simulated-molar attachment were not related significantly to sensory scores. For frankfurters, Instron measurements usually were significantly correlated with sensory scores for firmness. IFT



## 52

[Sensory analysis and quality control of foods. III. Planning, selection of judges and statistical design.] Costell, E.; Duran, L.

*Revista de Agroquímica y Tecnología de Alimentos* 21 (4) 454-470 (1981) [41 ref. Es] [Inst. de Agroquímica & Tecnología de Alimentos, Valencia, Spain]

This third part of this series deals with the selection and training of sensory panel members for studying consumer acceptance, and the statistical design of tests (complete balanced blocks, compound complete-incomplete blocks, incomplete balanced blocks, incomplete balanced blocks with reference sample). [See FSTA (1982) 14 2A122 for part II.] RM

## 53

[Assessment of sensitivity to basal tastes of dairy industry personnel.]

Bernotene [Bernotiene]. O.

*Trudy, Litovskii Filial Vsesoyuznogo Nauchno-issledovatel'skogo Instituta Maslodel'noi i Syrodel'noi Promyshlennosti* 14, 128-132, 159 (1980) [6 ref. Ru, li, en] [Litovskii Filial VNIIMSP, Kaunas, USSR]

Test involving participation of 490-497 workers whose duties included sensory analysis were carried out in factories of the Kaunas dairy combine to assess sensitivity to salty, acid, sweet and bitter tastes, using solutions of cooking salt, tartaric acid, sucrose and quinine hydrochloride, resp. In the 1st test, single solutions of the 4 substances and distilled water had to be identified; 13.5, 11.5, 9.9 and 25.7% of the subjects erroneously identified the 4 substances resp., and 25.3% made errors with distilled water. In the 2nd test, 5 dilutions of each of the 4 substances had to be arranged in order of intensity; 54.1, 56.9, 56.9 and 33% of the subjects graded the dilutions correctly. Particular difficulties with bitter taste are emphasized. A procedure for use in the Lithuanian dairy industry is recommended on the basis of the tests. SKK

## 54

[Sensory testing.]

Madsen, N. B.

*Brygmesteren* 37 (9) 233-246 (1980) [6 ref. Da]

Use of taste testing as an analysis method is discussed, mainly with reference to beer. After some comments on the panellists and their treatment, sensory testing methods are described, viz. simple quality control rating tests, difference tests and flavour profile analysis. DIH

## 55

[Training and selection of taste panellists.] Schulung und Auswahl von Prüfern.

Jakob, L.; Matheis, H.

*Weinwirtschaft* 118 (1) 10-14 (1982) [20 ref. De]

[Landes- Lehr- & Forschungsanstalt für Landwirtschaft, Weinbau & Gartenbau, Neustadt/Weinstrasse, Federal Republic of Germany]

Experience with selection and training of >400 taste panellists for official testing of high-quality wines is discussed, with reference to: individual differences in taste threshold values; sensitivity to off-flavours; training in detection and recognition of off-flavours; procedures for selection of taste panellists; changes in blood alcohol concn. during testing of wine; the impossibility of 'standardizing' panellists; statistical methods to reduce effects of poorly-performing panellists; and required characteristics of panellists. AJDW

## 56

Perceived sweetness and redness in colored sucrose solutions.

Johnson, J.; Clydesdale, F. M.

*Journal of Food Science* 47 (3) 747-752 (1982) [En] [Dep. of Food Sci. & Nutr., Massachusetts Agric. Exp. Sta., Univ. of Massachusetts, Amherst, Massachusetts 01003, USA]

Perceived sweetness and redness in 5 red coloured solutions containing 0.25-5.0% FD&C Red 40 were quantified using magnitude estimation. 3 panels of 14 subjects each evaluated solutions containing 5 sucrose concn. ranging from 2.7 to 5.3%. Colour had a statistically significant effect ( $p \leq 0.05$ ) on sweetness perception in 80% of the treatments. Sweetness in darker coloured solutions was 2-10% greater than the lighter reference when the actual sucrose concn. was 1% less. Sweetness increased linearly over all sucrose concn. and over a narrow range of colour intensities. Colour was measured using the Gardner XL-23 Colorimeter and the G. E. Recording Spectrophotometer. All colour measurements were converted to  $L^*$ ,  $a^*$ ,  $b^*$  and the value  $\arctan(a^*/b^*)$  was used to represent colour intensity. The perception of increasing colour intensity was a linear power law function of  $\arctan(a^*/b^*)$ . IFT

## 57

Effect of starter cultures on flavour characteristics and changes in the level of soluble protein content during ripening of Gouda cheese.

Balaiah, V.; Joshi, V. K.

*Indian Journal of Dairy Science* 33 (3) 390-392 (1980)

[6 ref. En] [S. Reg. Sta. of Nat. Dairy Res. Inst., Bangalore 560030, India]

Gouda cheese was made from cows' milk using various streptococcal starters. Flavour development was generally evident after 75 days. Cheese made with 50/50 *Streptococcus lactis*/*S. cremoris* had a higher flavour score than cheeses made with either organism alone, but when *S. lactis* subsp. *diacetylactis* was also included (30% *S. lactis* + 30% *S. cremoris* + 40% *S. lactis* subsp. *diacetylactis*) the cheese had a bitter flavour and received a low score. The pH of cheeses varied between 4.95 and 5.20 during ripening, and soluble protein increased from 9.9-11.5% on day 15 to 41.2-42.6% on day 150, the highest final level occurring in cheese made with *S. lactis*/*S. cremoris* starter. CDP



## 58

Scoring methods used in the sensory analysis of foods and beverages at Long Ashton Research Station. Williams, A. A.

*Journal of Food Technology* 17 (2) 163-175 (1982) [18 ref. En] [Food & Beverages Div., Long Ashton Res. Sta., Bristol BS18 9AF, UK]

The methods used at the Station include nominal, ordinal, interval and ratio [see Stevens, S. S. (1960) *American Scientist* 48, 226]. Methods of assessment (against a standard, using hedonic scales) and influence of scales used on results obtained are also covered. Application of the methods to specific problems (sensory properties of apples) is described. HBr

## 59

The two-factor triangle test.

Harries, J. M.; Smith, G. L.

*Journal of Food Technology* 17 (2) 153-162 (1982) [25 ref. En] [Meat Res. Inst., Langford, Bristol BS18 7DY, UK]

The triangular test, commonly used in sensory test of food quality, is generally interpreted on the assumption that the probability of a correct selection is the same for all assessors, and independent for separate trials leading to the use of the binomial distribution in setting up tests of significance. Only when there is no real discrimination is it true that using one taster  $n$  times is the same as using  $n$  tasters once, the basis for the column heading 'number of tasters or tastings' in published tables of significance. This paper attempts to remove this assumption by the use of the beta-binomial distribution, and suggests an interpretation in which the chance of success is different between and within assessors so that a 2-factor analysis becomes possible. A set of data relating to the flavour of fish has been reinterpreted in these terms. AS

## 60

Sensory evaluation guide for testing food and beverage products.

United States of America, Institute of Food Technologists

*Food Technology* 35 (11) 50-59 (1981) [109 ref. En]

This guide to sensory evaluation for testing food and beverage products is an update of a previous guide published by the IFT in 1964, which was reviewed and revised by Prell [*Food Technology* (1976) 30 (11) 40]. This guide is designed to serve as a reference for individuals working in the field of sensory evaluation, and to produce standardization and consistency of test procedures or results and covers the following topics: types of application including new product development, process change, quality control, storage stability, correlation of sensory with chemical and physical methods; and types of tests, covering analytical discriminative tests, analytical descriptive tests and affective (preference and acceptance) tests. SP

## 61

[Sensory examination and evaluation of foods: up-to-date methods.]

Molnar, P.

*Élelmiszervizsgálati Közlemények* 27 (1) 3-12 (1981) [35 ref. Hu, en, de, ru] [MEM Élelmiszereellenőrző és Vegyvizsgáló Központ, Budapest, Hungary]

After discussing the relationships and correlations between taste and consistency and between taste and odour, the conclusion was drawn that an up-to-date sensory examination should be supplemented by instrumental tests, especially in regard to colour and consistency. ESK

## 62

[Importance of sensory evaluation in flavour analysis.] Bedeutung der Sensorik in der Flavouranalytik.

Einhoff, K.

*Deutsche Milchwirtschaft* 32 (36) 1344-1348 (1981) [14 ref. De] [Bundesanstalt für Milchforschung, Kiel, Federal Republic of Germany]

This paper deals in detail with procedures of sensory evaluation of food aroma, and compares them with GLC examination. It is concluded that though GLC can present a very detailed picture of aroma compounds and their changes, it is incapable of assessing their sensory impact on odour and taste, and that sensory evaluation has the further advantage of speed and ease of execution. SKK

## 63

[Testing the competence of tasters of beer.]

Curin, J.

*Kvasny Prumysl* 28 (2) 25-28 (1982) [14 ref. Cs] [Pokusne a Vyvojove Stredisko Koncernu Pivovary a Sladovny, Prague, Czechoslovakia]

A practical commentary is given on the tests laid down in Czech standard ON 56 0110 "Organoleptic evaluation of food products" insofar as they apply to beer and brewing products. A "beverage discrimination test" is based on modified methods of the sensory competence tests given in EBC Analytica. A report on the outcome of practical testing of the sensory competence of evaluators is included. STI

## 64

[On the refinability of oil. IV. Refined rapeseed oil.]

Sambuc, E.; Devinat, G.; Naudet, M.

*Revue Francaise des Corps Gras* 28 (11/12) 459-466 (1981) [8 ref. Fr, en, de, es] [ITERG, Univ. d'Aix-Marseille, Place Victor Hugo, 13331 Marseille Cedex 3, France]

35 new rapeseed oils, freshly refined in a pilot plant under standard conditions were subjected to analysis and sensory evaluation. Re-grouping according to the immediate flavour score after the removal of rough centroid parameters as described in part II [see FSTA (1981) 13 5N239, Thurstone's centroid method of factorial analysis] allows selection of the most characteristic analytical tests. First order multilinear regression tests give simple relations providing with a fair degree of precision the immediate flavour score from the Fe content, absorption at 420 nm. and either



the P content or absorption at 270 nm. Comparison of analytical results (all tests) and immediate flavour scores (experimental or predicted) of all the oils suggests (within the framework of the tests conducted) the characteristics required for the new rapeseed oils in order to meet the threshold of immediate sensory acceptability. Experiments were also done to relate the flavour scores after 2, 6 or 9 months' storage to some characteristics of freshly refined oils. Equations were derived but require confirmation. [From En summ][See FSTA (1982) 14 4N217 for part III.] RM

## 65

**The choice of odour qualities for organoleptic evaluation of simulated meat flavours.**

Golovnya, R. V.; Syomina, L. A.; Yakovleva, V. N. *Nahrung* 26 (3) 243-251 (1982) [15 ref. En, de, ru] [Inst. of Organo-Element Compounds, Moscow, USSR]

With the help of a special group of 60 assessors, reflecting the taste preferences of the population, odour qualities were selected for verbal description of the aroma of simulated meat flavours. The selection was carried out in 2 stages, from 18 samples of flavours of different quality. In the first stage, 12 odour qualities were eliminated on the basis of 60 evaluations of 6 samples of meat flavours on the Harper [*Perf. Essent. Oil Rec.* (1968) 59, 22] scale. In the second stage, 120 evaluations were made of 12 samples according to a combined list of 40 odour qualities. As a result, the specific aroma characteristics for simulated meat flavours were revealed. A scale of 24 odour qualities is proposed. It was proved experimentally that this scale is convenient for evaluating not only good-quality simulated meat flavours, but also samples with off-odours acquired because of technological variation of their production or storage. AS

## 66

**[Ice cream. Sensory quality test.] Speiseeis. Eiskrem. Sensorische Qualitätsprüfung.**

German Democratic Republic, VVB Kühl- & Lagerwirtschaft

*German Democratic Republic Standard TGL 29126/03*, 4pp. (1980) [De]

A procedure for testing the sensory quality of ice cream is specified. An overall score of up to 20 is derived from 4 scores of up to 5 each for appearance, consistency, odour and taste, with weighting factors of 0.4, 1.2, 0.4 and 2 resp. The corresponding standard of 1975 is superseded. ADL

## 67

**[The new DLG test scheme.] Das neue DLG-Prüfschema.**

Weber, A.

*Ernährungs-Umschau* 28 (4) 122-124; 114 (1981) [4 ref. De, en] [Deutsche Landwirtschafts-Gesellschaft, Zimmerweg 16, Frankfurt a/M, Federal Republic of Germany]

Principles of the new 5-point scale test used to

evaluate food quality by the German Agricultural Society (DLG) are explained. Each of the points on the scale can be associated with commonly used verbal descriptors of quality. A rating is calculated from assessments of quality of individual characteristics (colour, flavour, etc.). Each characteristic is given a weighting factor, dependent on its importance to overall product quality, and overall rating given by the weighted aggregate. DIH

## 68

**Perception of texture by trained and consumer panelists.**

Cardello, A. V.; Maller, O.; Kapsalis, J. G.; Segars, R. A.; Sawyer, F. M.; Murphy, C.; Moskowitz, H. R.

*Journal of Food Science* 47 (4) 1186-1197 (1982) [En] [US Army Natick Res. & Development Lab., Kansas Street, Natick, Massachusetts 01760, USA]

## 69

**[New five-point scheme for evaluation of wines.]**

Neues Fünf-Punkte-Schema zur Weinbeurteilung. Anon.

*Weinwirtschaft* 118 (10) 254-255 (1982) [De]

The 5-point wine evaluation scheme proposed by the German Agricultural Society is described. Aroma, flavour and harmony are each evaluated on a 5-point scale; half points may be awarded. The final quality score is based on dividing the sum of these three scores by 3. A zero score may be awarded for any of the characteristics; this excludes the wine from further grading. The wines are also checked (on a yes/no basis) for typical characteristics for the year, grape var., quality grade, region of production, colour and clarity. AJDW

## 70

**[Method for the assessment of sensory judgements of tasters in wine evaluation.] Verfahren zur Bewertung der sensorischen Aussagen von Kostern bei der Weinbeurteilung.**

Schneyder, J.; Bailer, J.; Gidaly, G.

*Mitteilungen Klosterneuburg, Rebe und Wein, Obstbau und Früchteverwertung* 32 (1) 11-14 (1982) [8 ref. De, en, fr] [Landw.-chem. Bundesversuchsanstalt, Trunnerstrasse 1, A-1020 Vienna, Austria]

In addition to tests concerning the sensitivity and reliability of tasters described in the literature, the use of the difference-t-test is proposed for assessment of tasters in connection with their ability for sensory evaluation of wine regarding their function in an official wine tasting commission. Judgements of the tasters to be tested are to be related to the judgements of the remaining members of the commission, taking into consideration at least 150-200 wine samples. AS

## 71

**Eating quality of European beef assessed at five research institutes.**

Dransfield, E.; Rhodes, D. N.; Nute, G. R.; Roberts, T. A.; Boccard, R.; Touraille, C.; Buchter, L.; Hood, D. E.; Joseph, R. L.; Schon, I.; Casteels, M.; Cosentino, E.; Tinbergen, B. J.

*Meat Science* 6 (3) 163-184 (1982) [22 ref. En] [ARC



Meat Inst., Langford, Bristol, UK]

Comparative studies were conducted at 5 national meat research institutes on the organoleptic properties of beef from Denmark, the UK, Belgium, Italy, France, the Netherlands, the Federal Republic of Germany and Ireland. Aspects considered included juiciness, flavour, texture/tenderness, overall acceptability, ultimate pH, pigment, fat, total water, loosely-bound water, hydroxyproline, N and fat-free DM contents, colour and Instron toughness value. Tables of results are given. Variation in results is discussed in detail, with reference to differences between testing stations and between sites of production. Standardization and equivalence of sensory testing is discussed. The importance of country of origin and of pre- and post-slaughter variables for the quality characteristics considered is briefly outlined. AJDW

## 72

### Range bias in sensory evaluation.

McBride, R. L.

*Journal of Food Technology* 17 (3) 405-410 (1982)  
[7 ref. En][Food Res. Lab., CSIRO Div. of Food Res.,  
PO Box 52, North Ryde, New South Wales 2113,  
Australia]

Effect of stimulus range bias (or centering bias) in sensory evaluation was studied using a panel of 24 experienced testers asked to assess sweetness of flavoured milk beverage samples differing in glucose concn. Single (sequentially monadic) presentation of samples (glucose concn. in the range 2.0-8.0%) showed that optimum sweetness was 2.6%. Multiple presentation of samples was arranged so that on 3 successive days assessors were presented with a different concn. range: 0.5-3.5%, 2.0-5.0% and 3.5-6.5%. Samples within each range were presented simultaneously. Results from multiple presentation tests indicated presence of a stimulus range effect; optimum glucose concn. was perceived as 2.5, 3.2 and 4.1% for the low, medium and high concn. ranges, resp. Mathematical correction for the stimulus range effect showed that an unbiased estimate of optimum glucose concn. would be 2.7%, i.e. very close to the single presentation result. Although multiple presentation results can be corrected to give unbiased results (if suitable ranges are used), it is suggested that single presentation is a simpler method of obtaining accurate sensory assessments. DIH

## 73

[Standardization of sensory food examination.] Zur Standardisierung der sensorischen Lebensmitteluntersuchung.  
Neumann, R.

*Élelmiszervizsgálati Közlemények* 27 (5/6) 243-257 (1981) [20 ref. De, hu, en, ru][Fachabteilung Nahrungsgüter, ASMW, Fürstenwalder Damm 388, 1162 Berlin]

Standardization of sensory evaluation of foods within COMECON is discussed with reference to: definition of terminology; standardization of sensory test methods; and selection and training of test personnel. Examples of lists of descriptive terms for use in sensory testing are given, together with consideration of various sensory test methods and their interpretation. AJDW

## 74

### Biochemistry of taste and olfaction. [Book]

Cagan, R. H.; Kare, M. R. (Editors)

xxiv + 539pp. ISBN 0-12-154450-8 (1981) [many ref. En]  
London, UK; Academic Press, Inc. Price £25.60; \$38.50  
[Veterans Administration Med. Cent., Philadelphia, Pennsylvania, USA]

This book on research on the chemical senses covers a wide range of disciplines and should be of value to food scientists with an interest in taste and flavour chemistry. The book is divided into 5 parts: I Olfactory receptor mechanisms; II Taste receptor mechanisms; III Physicochemistry and transduction; IV Neurotransmitters in taste and olfaction; and V Analogous chemoreceptors. Chapters of special interest to food scientists include the following. Comparative study of sweet taste specificity, by W. Jakinovich, Jr. (pp. 117-138, many ref.). A molecular approach to intensity/time phenomena in sugar sweetness, by G. G. Birch (pp. 163-173, 39 ref.). Recognition of taste stimuli at the initial binding interaction, by R. H. Cagan (pp. 175-203, many ref.). A subject index (pp. 529-539) is also included. DIH

## 75

### Perceived textural dimensions of fruit-based beverages.

Ingate, M. R.; Christensen, C. M.

*Journal of Texture Studies* 12 (2) 121-132 (1981)  
[13 ref. En][Monell Chem. Senses Cent., Philadelphia, Pennsylvania 19104, USA]

The major sensory dimensions of the mouthfeel of several canned and instant fruit-based beverages were determined by principal components analysis and the degree of correlation between mouthfeel characteristics and the taste and pleasantness of beverages was assessed. Untrained college students rated 35 different beverages on 16 different 10-point scales containing mouthfeel, taste and hedonic terms. 2 major mouthfeel dimensions emerged with this set of beverages and they were termed density/thickness and chemical irritant effect. An interdependence between mouthfeel and taste ratings was also found. Sweetness ratings were negatively correlated and sour, salty and bitter tastes were positively correlated with mouthfeel terms describing oral mucosal irritation. AS

## 76

[Special test method for evaluation of the taste of boiled sweets.] Spezielle Testmethode zur Beurteilung des Geschmacks bei Hartkaramellen.

Habersaat, F. C.

*Süßwaren* 26 (4) 122 (1982) [De]

Sweets are dissolved overnight in a defined quantity of water; the solution is then evaluated organoleptically after vigorous agitation. This method eliminates errors due to differences in surface characteristics of the sweets, different degrees of secretion of saliva by the test personnel and consequent differences in solubilization of the sweet. IN



77

[Correlation between instrumental and sensory consistency evaluations of "pasta".] Korrelation zwischen instrumenteller und sensorischer Konsistenzzerfassung bei Teigwaren.

Emschermann, G.; Schmitz, G.; Bielig, H. J.

*Gordian* 82 (1/2) 13-14, 16-20 (1982) [11 ref. De] [Inst. für Lebensmitteltech., Tech. Univ., Berlin]

The Instron Universal Testing Machine with a Kramer shear cell was used to compare instrumental and sensory panel evaluations of the consistency of cooked pasta (ribbon and twisted noodles) and examine the effect of adding 1% oil to the cooking water, cooking in drinking water with 1% NaCl or in a 1:1 mixture of this with distilled water. A 5 point scale used for sensory evaluation and a 10 point scale for tenderness are shown in tables. Results, shown graphically and in tables, were subjected to statistical analysis. Correlations >95% were obtained for tenderness between the results of the 2 methods under all cooking conditions ( $r = 95$  to  $99.9\%$ ,  $r^2 = 0.8165$  to  $0.8999$ ). The other sensory data (taste, smell, colour, shape, etc.) were not expected to be correlated with instrumental results. RM

78

Studies in flavor components in boiled crabs. V. Comparison of taste between natural and synthetic extracts of snow crab meat.

Hayashi, T.; Furakawa, H.; Yamaguchi, K.; Konosu, S. *Bulletin of the Japanese Society of Scientific Fisheries* [*Nihon Suisan Gakkai-shi*] 47 (4) 529-534 (1981) [6 ref. En] [Lab. of Marine Biochem., Fac. of Agric., Univ. of Tokyo, Bunkyo-ku, Tokyo 113, Japan]

For developing a vocabulary that can describe the taste characteristic of natural and synthetic extracts of boiled snow crab *Chionoecetes opilio*, 5 trained panelists first tasted the extracts and selected a total of 18 terms (items), viz. 9 primary qualities for taste, 8 secondary qualities for taste, and overall taste. Using this descriptive vocabulary, a 30 member panel evaluated the differences in taste between the 2 extracts. Mean scores of each of the primary qualities showed that the synthetic extract had almost the same intensity of sweetness and sourness as the natural one, but had weaker saltiness, stronger pungency, and somewhat stronger astringency, metallic taste, and alkaline taste. Of the secondary qualities, mean scores for the synthetic extract were lower than those for the natural one in all 8 items. Pattern and subtracted pattern similarities calculated for the primary and secondary qualities suggested that preferential increases in saltiness, pungency, bitterness, astringency, naturalness, and viscosity should be effective in reproducing the taste of the natural crab extract. Correlations among the 18 items showed that *umami*, sweetness, saltiness, complexity, fullness, naturalness, continuance, viscosity, and extension should be considered first in the preparation of a synthetic extract as a flavouring material. [See FSTA (1981) 13 9R654 for part IV.] AS





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